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Thomas K. Beecher

Elmira

THE
ARCHITECTURAL DIRECTOR:

BEING A GUIDE TO
Builders, Draughtsmen, Students, and Workmen,
IN THE
STUDY, DESIGN, AND EXECUTION OF ARCHITECTURE
CONTAINING
COMPREHENSIVE COMPARATIVE TABLES
OF THE RESPECTIVE PROPORTIONS OF EACH MEMBER OF THE ORDERS OF ANTIQUITY, AN
THOSE OF THE MODERN MASTERS;
AND DETAILED TABLES
PRESENTING THE DIMENSIONS OF EVERY MOULDING IN THE ORDERS OF VIGNOLA,
TOGETHER WITH
Plates showing the Particular Form of each Distinct Part,
AND THE DIFFERENT METHODS OF TRACING THEM;
WITH ARCADES
ADAPTED TO THE SEVERAL ORDERS, WHEN EMPLOYED EITHER WITH OR WITHOUT PEDESTALS
AND ALSO
THE PUREST EXAMPLES
OF ALL THE OTHER PARTS WHICH ENTER INTO THE COMPOSITION OF EDIFICES;
THE WHOLE
REDUCED TO MODULES AND MINUTES, OR PARTS:
FOLLOWED BY
Plans, Elevations, and Sections of various Buildings and Edifices:
TO WHICH ARE ADDED,
A HISTORY OF THE ART FROM ITS ORIGIN: A DESCRIPTION OF, AND OBSERVATIONS ON
THE MOST CELEBRATED ANTIQUE AND MODERN EDIFICES: A DEVELOPMENT OF TH
ESSENCE OF THE ART, EMBRACING THE IDEAS OF ORDER, SYMMETRY, VARIETY,
HARMONY, UNITY, BEAUTY, INVENTION, ETC.: A MINUTE EXAMINATION OF
THE PARTICULAR QUALITIES AND SUITABLE EMPLOYMENT OF THE
CONSTITUENT PARTS OF EDIFICES:
AND
A GLOSSARY OF ARCHITECTURE,
INCLUDING
CARPENTRY, JOINERY, MASONRY, BRICKLAYING, SLATING, PLUMBING,
PAINTING, GLAZING, PLASTERING, ETC.

By JOHN BILLINGTON, Architect.

Second Edition, greatly enlarged,
ILLUSTRATED BY NEARLY ONE HUNDRED PLATES AND TABLES.

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PREFACE.

A work on Architecture which would supply the place of a great number of books that treat only on distinct parts of the subject, and also present a clear and perspicuous detail of the theory and practice of the art, has long been a desideratum, both to the practical man and the student. Indeed, a knowledge of the theory and beauties of architecture, concerns almost all; since it is only by the possession of this knowledge, that architectural productions can be appreciated. In order to give an increased interest to the present work, and to facilitate the attainment of a correct taste, a comprehensive history of the art is given, from its origin to the present time; containing an ample description of the most celebrated antique and modern edifices, a comparison of the styles of the different artists who executed them, and a brief notice of their beauties and defects. It furnishes a body of useful and interesting information, which is rendered still more complete, by the comparative tables that accompany the detailed explanations of the orders; in which will be found a comparison of the general proportions, according to which the different parts of each of the orders were executed, in the most celebrated edifices of antiquity. To these are added the proportions assigned to them by modern masters. Each of the constitutent parts of edifices, and also what relates to distribution and decoration,

are treated on at considerable length. The sources whence the art derives its means of expressing character are fully developed; and are offered to the notice of the student, as worthy his most serious attention.

In illustration of the historical portion of the work, the examples furnished by Italy have been offered. These are not given as copies for servile imitation, nor are they supposed to be entirely exempt from faults; neither must it be forgotten that our climate, materials, and customs, often prescribe other forms than those which they exhibit. The liberty has been taken of divesting them of everything that might be considered injurious to their good effect.

On construction, the necessary information will be found in the glossary; which also contains an explanation of the terms used in the theory and practice of the art; and comprises separate treatises on every branch relating to building.

Landscape gardening, as connected with architecture, is not omitted.

The Author's object has been to produce a complete body of information; in doing which, he has availed himself of assistance from the most valuable and authentic sources, both in England and France; and he has endeavoured to condense and simplify the opinions of others, in uniting them with his own. Should his labours conduce to the advancement of architectural knowledge, his desires will be realized; and his labours will be repaid by the gratifying consciousness of their utility.

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THE

ARCHITECTURAL DIRECTOR.

WHAT ARCHITECTURE IS; AND THE KNOWLEDGE REQUISITE TO AN ARCHITECT.

ARCHITECTURE is generally defined to be the art of building, but this definition does not carry with it a sufficiently positive and extended meaning. If the art of building be considered relative to architecture, it is nothing more than construction; if it be considered relative to our wants, it appertains to all ages and to all countries: but the art of architecture, according to the etymology of the Greek words *αρχη τεκτονια*, far from being common to all nations and to all ages, is confined to a few centuries, and only to a few privileged countries; and ought to be defined the art of building according to certain rules and proportions, determined by natural causes and the perfected faculties of man. The art of building is found amongst all savage nations; but the art of architecture can only be the result of society, enlightened by civilization and the other arts.

Architecture is an art that requires great judgment and diversity of studies, to enable a person to form correct opinions of the works of others appertaining to it. It is acquired by theory and practice.

The theory of architecture is that knowledge of it, acquired by the study of the remains of antiquity, by the writings of the most learned authors, by travels, and by meditation. The practice, is the knowledge which is gained by the executing and conducting of buildings.

The etymology of the word architect indicates that the person thus designated is the inspector and chief of those employed in the erection and completion of edifices; and that he has the general direction of the works and of their execution; which supposes a union of rare qualities and very extended knowledge. The knowledge Vitruvius required of an architect, shows the idea the ancients formed of architecture, and the degree of esteem to which those might aspire who professed it. Pythius, one of the most celebrated architects of antiquity, required of an architect a more profound knowledge of each particular branch connected with the construction and decoration of edifices, than he considered necessary to him who exercised only one of these. But Vitruvius, more judicious, required only a medium knowledge of each.

When we consider the time required for the study of architecture, the necessary expence incurred, the travelling and difficulties incident to the attaining of that degree of talent, which warrants the assumption of the title of architect; how few resources does it present, to those who follow it as a profession, notwithstanding that its utility doubtless ranks it, first amongst the Arts. Furnish a painter with a small piece of canvass, pencils, and a few colours, and if he be a talented artist, he will in a short time produce a painting of considerable value; his fame and fortune

resting entirely within the power of his pencil. But an architect is placed in a very different situation; his talent is obstructed and confined by a multiplicity of circumstances. His first business is to examine well the site of the intended edifice; after this he forms his designs, which he studies, finishes, and then arranges the whole for execution. His attention is next directed to the quality of the materials that may be necessary, their judicious appropriation and value; as also the choice of workmen whose abilities he has to appreciate and direct; and finally that his design when executed shall possess solidity, convenience, and beauty; and which, generally, must be effected by an economical application of resources. What are the gains of a talented architect, after his completion of an edifice that shall be a credit to the age, and which shall have cost him so much exertion and care? That portion of fame awarded to those who follow with talent and disinterestedness, the practice of the fine arts. More fortunate still if he can peaceably enjoy this fame. Perhaps he is attacked by that envious calumniator, detraction; his edifice is criticised, and its cost exaggerated; he is accused of having studied to enrich himself; whereas probably he has sacrificed his fortune to ensure his fame. Hence all confidence is destroyed, and his talents lie unsolicited and neglected.

The same remarks will partly hold good as respects public works; the designs that may be tendered, will perhaps be examined, commented upon and passed; but when the final selection is made that is to determine the design intended for execution, then it is that the man of talent is driven away to make room for

the patronized. Hence arise those productions which are found so unworthy of being transmitted to posterity.

Literary knowledge and history are much more useful to a modern, than they were to an ancient architect. Vitruvius required that an architect should be able to assign a satisfactory reason for the employment of every architectural object, which his designs might present. How much more indispensable then are these studies at the present day, since by the adoption we have made, or rather ought to make, of the antique architecture, an architect finds himself perpetually necessitated to employ an infinity of parts or ornaments ; the common and parasite use of which can only become ridiculous, if not directed by a judicious and enlightened mind. The science of history, as it includes that of architecture, discloses the revolutions of an art which, more than any other, is linked to the destiny of the nations that employ it. In following its origin, progress, and decadency, the student will distinguish the changes of taste, and varieties of style, adopted in different ages by different nations; he will habituate himself to the discernment which the monuments of antiquity require, and the studies he ought to make from them.

Drawing ought to form the basis of his education; and some authors have insisted that no one can become a good architect without having a perfect knowledge of painting or sculpture. It is astonishing to contemplate how great a number of celebrated architects, who, to a proficiency in architecture, united a superiority in other arts, of which it is rare at the present day to attain eminence in one. But

without going so far back as to the Greeks and Romans, do we not find this union of superior talents in individuals in the flourishing centuries of modern Italy? Do not all the arts related to drawing, dispute the right to the renowned names that Fame has inscribed on the records of each? To make a just enumeration would be almost to except none. It was as rare at that time to profess but one art, as it is in our days to possess more than one. It would form too long a list to mention all the celebrated painters and sculptors who also possessed, to a very high degree, a knowledge and taste in architecture, and who have left posterity in doubt under which of the arts their names ought to be inscribed. Amongst them we read the names of Giotto, Orcagna, Mantegna, Michael Angelo, Raffaello, Giulio Romano, Polidoro, Vasari, Volterra, Pellegrini Tibaldi, Cigoli, Giovanni Bolognese, Domenichino, Cortona, Algardi, Bernini, and Carlo Maratti. Opposite to this list may be placed the great masters of architecture, who, to a knowledge of that art, united, in a more or less eminent degree, a practical knowledge of the other arts related to drawing; at the head of which stand Brunneleschi and Ammanati, who left more than one monument of their knowledge of sculpture; Sansovino, Palladio, and San-Gallo, who were equally able sculptors; Bramante, Vignola, Alberti, and many others, who exercised in turn the pencil and compasses. In fine, it may be proved that there exist few beautiful architectural productions, which are not the result of a combined knowledge of the arts in those who were their authors.

The reason of this union of talent in several arts,

formerly so common, but at the present day so rare in one individual, was, that in former times, one spirit presided over the arts, one chain connected them, and this common bond was, drawing, or a practical knowledge of natural proportions, which forms the base of architecture, sculpture, and painting. By consulting the memoirs of the lives of the celebrated artists of that early period, the truth of what is here advanced will be discovered; namely, that their early education was the same, and that the most able architects formed themselves in the school of the most eminent painters. Modern institutions, in extending and rendering the mechanism of each art more difficult, and in contracting genius within a limited circle, have not broken this fraternity, though at the present day it has no more than a name, and no longer exists but in the writings of those who treat on the subject. The arts at that time were really fraternal, and the artists formed a family that enjoyed and enriched themselves from a common patrimony. Instructed in the principles of all the arts, they passed indifferently from one to another, or confined themselves to that with which their taste or circumstances rendered them most familiar; but always preserving the analogies which their first studies had taught them. It often happened that chance alone caused them to exercise an art in which they had not until then had any practice, and suddenly developed a talent, the acquisition of which at the present day seems to require the exertions of a whole life.

"The cause of the facility which painters and sculptors have in learning architecture," says Vasari, "is that the one and the other, whether in the rela-

tion of statues to edifices, or the necessity of drawing and composing architecture in their paintings, are obliged to acquire a knowledge of this art, and to study the rules and proportions relative to it." But a more immediate relation unites the arts together—that of drawing; and it may be easily perceived in what manner it necessarily applies to architecture. If the proportions given to this art were partly the result of those offered in nature, then he who habituated himself to the study of them in the book of nature itself, would make more correct applications of them, than they who are impelled by a mere practical imitation of works and edifices, in which they are less sensibly imprinted.

It is inexpressible how much this practice is useful to an architect, in the execution of drawings; even independent of the great light which may be derived from the study of the other arts, for invention, correct expression of character, and resources of decoration. A knowledge of chiaroscuro effects of light, contrast of parts, and their accord or antipathy, furnishes him with all kinds of resources; it shows him the faults, which a flat and mute manner of shading and colouring designs, will never make him perceive; which only discover themselves in the execution, when it is too late to remedy them.

Professed architects have justly reproached some painters of having rendered the spirit of architecture unnatural in their edifices, by substituting decoration; and of having made the resources of their art predominant in the edifices. It is well known that for a long time painting and sculpture governed architecture, by which it lost its greatness and intrinsic

beauty: but this circumstance must be attributed to the bad taste reigning at that time in all the arts, to which indeed the painters materially contributed. If the edifices invented and conducted by the painters and sculptors of the flourishing centuries be examined, they will be found to exhibit the correct taste which reigned in their other works. It was not because Cortona and Boromini were painters, that they employed licentious architecture, since Raffaello, Giulio Romano, and many other painters and sculptors, have left us models of the most regular and best reasoned architecture: but the one and the other applied to architecture the taste and style of the other arts which they professed, the principles of which, good or bad, according to the time, were common to architecture.

But whatever may be the strength of these authorities, and the consequences that may be drawn from them, a union of the different arts cannot be made at the present day. For though nature has united them, and their common interests draw them together, yet the modern form of education and manner of study, tend to insulate and divide them. Timidity and weakness, the result of method so fatal to genius, makes the idea of re-uniting the sister arts chimerical; as they are separated by barriers which are become insurmountable. But if we can no longer require of an architect, with Vitruvius and Vasari, that he excel at the same time in painting and sculpture, at least ought not a theoretical knowledge of these arts to be required of him? The art of drawing cannot be too much practised by him, whether it be for the figures which ought to ornament his designs, for ornaments

of all kinds, the composition of which belongs only to him, or for the direction of the workmen and artists, to whom he ought to communicate his ideas, and transmit his taste and style.

All the branches of knowledge hitherto enumerated, form but the accessories of the art; but architecture, above all other things, requires discernment, and the talent of invention. What fineness of taste, what energy of mind does it demand! The same feelings which animated Homer and Raffaello ought to have inspired Palladio, and must be possessed by every architect who aspires to appear in the first ranks of an art which is the base of all the others, and which first announces a degree of civilization, taste, and intelligence in a nation. The genius of an architect developes itself on contemplating the monuments of antiquity, which he ought to examine with reason and discernment; and should endeavour to discover the few rules which they dictate; for originally the rules were but few in number, though subsequently routine and precedent have greatly multiplied them.

A student ought to commence early to invent and produce. As soon as he has acquired a general idea of architecture, a facility in drawing, and a knowledge of the most beautiful models, antique and modern, he should apply himself to compose. Invention, in architecture, is to produce from the imagination an idea of an edifice which is not copied from any other already in being; and the invention will be good if the parts are distributed with order, proportion, and convenience; if the ornaments are combined with correctness, elegance, and propriety; if the edifice in its parts and total be appropriate to its intended uses;

and if it has the requisite solidity. To invent so that the designs may be executed without difficulty, and may obtain the approbation of persons instructed in the principles of the art, is that degree of knowledge in architecture at which he ought to aspire. But it is much more difficult to attain than is imagined. The efforts and ambition of those who are destined for this art, cannot be too soon directed to this object: they too often lose the most precious of their years in copying the works of others—working through life on barren traces, without fruit and honour.

IN WHAT ARCHITECTURE CONSISTS.

Architecture consists in forming an edifice or building, so that it shall be solid, agreeable to the view, convenient, have all its parts in perfect relation to each other, and be of a convenable character, which is always determined by the uses for which it is destined.

By a solid building is understood one which has all its parts bound with exactness, is of sufficient thickness to give them a proper consistence, and in which the footings, retreats, and necessary exterior inclination, are not neglected; so that the whole is fixed by an invariable equilibrium.

But as a building that is merely solid will have nothing agreeable to the view, or useful for the pur-

pose to which it is destined, it is therefore necessary to produce beauty in the ordonnance, or proportion and decoration of the parts, and convenience in the distribution.

A building which is convenient is one whose parts are such as its destination require; and this destination determines the number and situation of the apartments, stairs, passages, and communications; which latter should be free and easy, each part showing its use and importance in the respective proportions, when compared one with the other.

A well-proportioned building is one which in all the parts of its plan presents such harmony in its divisions, that each of its parts has evidently an essential relation to the others; it is also necessary, in the elevations, that the heights should be adapted to the lengths, and that the apertures should be supported by symmetrical and proportioned planes. The genius of the art consists in proportion. It requires the deepest study, with a correct taste.

Thus, eurithmy, or proportion, is the agreeable relation of the parts to each other, and with the whole. From this accord, unity, and modulation, results the harmony of all the parts of an edifice, whether it be in the general division of the elevation, or in the interior and exterior decoration.

Symmetry is the uniform correspondence of similar parts, which ought to be the same in number and disposition at each side of an edifice, in order that the whole may have an imposing appearance, and be easily understood.

To eurithmy and symmetry belong unity, variety, order, simplicity, and the progression from the simplest

to the most ornamented. But architecture having necessity for its foundation, there results—Firstly, That its beauty ought to imprint this character of necessity : and the necessity of all its parts ought also to be apparent. Secondly : That the ornaments ought to be derived from the nature of the edifice itself, and result from the want which it might have of them. Hence to ascertain the merits of architectural compositions, the following rule may be advantageously employed. Examine if each and every part separately and collectively unite to the greatest possible extent : a characteristic expression of beauty ; convenience ; and a real and apparent solidity. Whoever adopts these principles, which are founded on reason, will neither be imposed upon by authority, celebrity, nor custom. They will also observe the two following rules :—

The first is of indispensable necessity in all kinds of buildings, and in each of their parts, and cannot be neglected without the risk of incurring censure ; such as false bearings, planes over apertures, shapeless and misplaced pediments, penetration of pilasters, bastard orders, different orders on the same plan or in projection, as also the most solid placed under the most delicate, or the heaviest under the lightest, without their intermedials. These are necessary deductions, drawn from the true principals of beauty, propriety, and solidity, which properties ought to be found in every building ; and not only exist, but be apparent.

The second is useful or agreeable on certain occasions, and may be used when required, or according to circumstances. The relations of the dimensions in the orders are not of a precision that admit of no variation. What necessity is there, for example, that

the Ionic columns should be exactly nine diameters? and why the metopes perfectly square? But as it before has been observed, it is only in cases of the greatest necessity that these licences should be taken; for care should be observed to give to them only a latitude of a certain circumference, and to endeavour to produce beauty by various means; at the same time being attentive to those invariable principles and necessary rules, the transgression of which can only produce wanderings that will serve rather to shock our sight, than enlighten and conduct our reason.

Justness of sight decides the second rule which may be omitted or modified, according to circumstances, not only in the harmony of the dimensions, but in the choice and number of the ornaments, and the quality of the forms. Is there a reason for not applying the Doric frieze to the Corinthian order? Yes; the delicacy of the one would be injured by the expression of strength in the ornaments of the other.

The application of the above-mentioned rules relates to the principal ordonnance of the edifice, which is the form, proportion, and distribution of its parts, as also to the decoration of the whole and of its parts, interior as well as exterior.

After an architect has formed a precise idea of the required conveniences of any edifice, it rests with him to design it in the best possible manner A sound judgment will enable him to determine, in al. cases, the particular expression of character which his edifice should assume; how to dispose the accessories and adjacent objects; to overcome all obstacles by fortunate inventions, according to the nature of the site; to give it a uniform and yet varied appearance, and

to prevent confusion in those parts where the different wants are found to be in opposition. To the architect also belongs, if the locality permit, the privilege of determining the extent of the edifice, and the number of its principal parts; of giving them a suitable size, according to the uses to which they are to be appropriated; of afterwards distributing and reuniting them so as to form a whole, in such a manner that each part will be found placed where it is most suitable or convenient, and that the total will present interiorly and exteriorly, a convenient, solid, and beautiful edifice, analogous to its kind and destination. No one part ought to predominate to the detriment of another; and while there is no appearance of excess, still nothing should be omitted that could be desired for its completion. It will thus manifest the genius of the artist; and thus alone will it be beautiful in its details and total; and so much the more so in proportion as the total and its parts present distinctly and at the first glance a free accordance, and a combination that agreeably fixes the sight.

The appearance of such an edifice gives rise to an inexpressible pleasure and fascination in the beholder. It awakens in the mind exalted and enlarged ideas. The spectator feels those delightful emotions and agreeable transports which are excited by productions bearing real marks of superiority of mind.

ON THE ORIGIN OF EACH OF THE CONSTITUENT PARTS OF THE ANTIQUE ARCHITECTURE.

Architecture, says M. Quatremere, did not commence to be an art in the countries into which it was introduced, till its inhabitants had attained a certain degree of civilization, opulence, and luxury. It was then that man, removing more from rustic labours and occupations, and seeking society in cities, endeavoured to substitute for the pleasures of nature, which were lost to his view, those of the arts, which are the imitators of nature. Before this epoch, architecture ought to rank only amongst the occupations necessary to the wants of life, which in those early days being very limited, its use was confined to making shelters from the inclemencies of the seasons. It was from these rude shelters, which varied in form in most countries, that those remarkable differences originated which we find impressed on the architecture of different nations.

The first model, rude as it was, had in it certain characters which have never been lost sight of, and which may be traced in edifices of the highest grandeur. But whose eye is sufficiently exercised to detect the delicate shades in all countries? When the art had arrived at the greatest perfection, it was often attempted to search after its infant progress; but was it not then too remote for discovery? We are doubtless in want of the means to make accurate researches amongst people separated from us by an immense interval of centuries and of place; and like-

wise of gaining a positive knowledge of the exact sites of the states founded by the first societies, their physical situation, the nature of their climates and productions, the number of inhabitants, their origin, first social institutions, modes of life, and such other causes as account for the variety in the modes of construction of different nations. Nevertheless, the general differences remarked in the architecture of different people of the earth, may be attributed to the three distinct states which nature seems to have assigned to man; for it is certain that these had a necessary influence on the first habitations of natural life, which in all countries have served for the models of architecture.

In primitive times, man, docile to the hand of nature, received from it the three states or modes of life which distinguish, even at the present day, the different nations of the universe. Those aborigines, according to the nature of their climate and locality, must have been hunters, shepherds, or husbandmen; and the first habitations, analogous to these three kinds of life, could not but be adapted to their wants, and bear very distinct characters.

Those people or nations who lived by the chase (and in the same class the Ichthyophagers are included) could not for a great length of time have built themselves shelters. The long courses the hunters made prevented them from watching their property, which must have comprised few articles; and they found it more convenient to make hollows in the rocks for their dwellings, or to profit by those which nature offered them in its caverns. It was the same with those who lived by fishing: passing a

sedentary life on the sea shores, the sides of rivers, or the borders of lakes, they always made themselves such abodes, or took advantage of those already formed by nature. The little industry which this mode of life required, and the natural idleness which followed it, was sufficient to induce them to prefer the dwellings presented by nature, to those of art. This fact is proved by experience at the present day, as these descriptions of persons continue to adopt the same plan of life in countries where the arts of civilization have not extended their beneficial influence. The pastors or shepherds, as they were inhabitants of the plains during a great portion of the year, could not make use of the retreats hollowed and prepared in the mountains and rocks by the hand of nature: being obliged continually to seek change of pasture, and thus lead an ambulatory life; it was requisite to have dwellings, or shelters, that could be carried with them wherever they went; and hence originated the use of tents. But the active operations of agriculture requiring locality of situation, necessity suggested the propriety of building solid and fixed abodes. The agriculturist then living on his own grounds, and in the enjoyment of his property, had to store his provisions; it was therefore necessary to have a habitation at once commodious, safe, healthful, and extensive: and the wood hut, with its roof, was soon erected.

Such are the three states of natural life; and to these may be attributed the origin of all constructions, and the differences of taste met with in different nations. It is impossible for these three modes of life not to have produced a sensible expression in archi-

tecture, and very remarkable varieties of style. The proof will be found visibly imprinted in the works of art which succeeded these rude sketches of nature The simplicity and truth of this theory cannot be denied, since it is so far removed from the spirit of system, as to ground on that circumstance a convincing argument in its favour.

The strange contradictions found in all works which treat on the origin of architecture have been occasioned by not having perceived this triple cause of difference, and by endeavouring to subordinate to one system alone, the various productions and effects of an art which must have been diversely modified according to local circumstances. But it would be an erroneous idea to suppose that each country had one principle only for the results of this art, since it is probable that architecture had in certain nations a double principle, as may be seen in the Egyptian. Though other circumstances might have influenced the formation and taste of the different styles of architecture, they will nevertheless be found dependant on the causes just mentioned. It is particularly necessary to trace the art to the three states of life, and to learn the reasons of the great variety observable in it, in order to prevent the confounding of the art of one nation with that of another. Without this knowledge the risk would be incurred of falling into the error of forcing into one system the most contradictory and discordant ideas, or of substituting chance for the natural order of things. Chance or caprice might have had influence in some of the detached forms of architecture, in the details, or in some of the objects of decoration; but it could not have produced the

peculiar and characteristic taste of each country, the principle of which may be clearly distinguished in their edifices. Should there, then, be any hesitation in acknowledging the causes, when, independently of all other considerations, their effects are sufficient proofs?

Some philosophers, struck by the prodigious excavations made by the hand of man in many parts of the globe, have endeavoured to find the birth-place of architecture in subterrains only; but by generalizing this system too much, and extending its application to all the nations of the universe, they have fallen into gross errors. Subterrains have been found in almost all the nations of antiquity; but philosophers have put themselves to little trouble to discover the motives for making these excavations, which were much varied in their forms. It is known, however, that these singular and prodigious works in many places are nothing more than the natural and progressive result of quarrying. There are many convincing examples of these quarries; for instance, such as those of Syracuse, which cease to be marvellous, when it is remembered that this immense city, in all its constructions, employed only the stone cut from its mountains. Many other proofs of similar errors might be adduced, as where the catacombs, sepulchres, and hypogeums, the depositories of the dead, have been blindly mistaken for the first habitations of the living. Hence it is indubitable, that the nature and destination of a great number of subterrains have been misunderstood; and thus has a very false principle been applied to the architecture of particular nations, which, though it may sometimes happen to be correctly used, cannot be applied universally. It requires then the assistance

of history, a knowledge of the manners of a nation, of its origin, and of its first mode of life, and to be acquainted with the parallel of its subterrains with its architecture, and the predominant style in it, to decide such subjects. When this knowledge is gained it will be owned that the Egyptian architecture was governed by the taste of the subterrains, which formed the first habitations in this country, the natural and immemorial employment of which has never been lost in this nation. The massive and colossal character of their constructions has too much resemblance to their most ancient subterrains, and to their grots, afterwards hollowed and embellished by art, to suppose any other origin to this style of architecture. And though afterwards they acquired the art of joining the composed forms, and the parts indicative of the carpentry, to this primitive taste, it may notwithstanding be perceived that wood was never the first type of the Egyptian architecture.

The same spirit may be discovered in one part of the Asiatic architecture: the climate and the same physical causes must there have inspired the same taste for subterraneous dwellings. The mighty works of this kind that are admired even at the present day, but the epoch of which has been lost in the lapse of time, leave no doubt as to the probability of their origin. The columns of the Pagoda Elephanta, cut in the rock, bear no resemblance to a tree. Their short and massive proportions, the forms of their capitals, and all the accessories are so different from the columns resulting from carpentry, that it is necessary to be not only blind, but partial, to refuse a derivation so natural and reasonable. But from the

architectural taste of India can that of China and Japan be inferred? The first certainly results from stone, or the hewn caverns and grots, and is distinguished by the want of an inclined roof, and by the hugeness of its massive proportions; but must the same origin be assigned for the Chinese architecture, in which wood is particularly predominant, and in which the lightness, the ornaments, and the general taste, show little resemblance in the formation, or concurrence in the productive causes? M. Paw observes, that one cannot mistake the object which has served for a model to the first habitations of China; they have imitated a tent; and this is conformable to what can be learnt from the truest accounts of the primitive state of the Chinese, who, like the Tartars, the Nomades, and the Scenitæ, encamped with their flocks before they had cities. It is impossible not to discern this origin in their curved roofs made in the pavilion form, in the little solidity of their edifices, and in the peculiarity of their constructions. A Chinese city, when first beheld, may be said to resemble a fixed camp; and the immense extent of their cities proves, that their houses are not sufficiently solid to support several stories.

It is thus certain that the primitive wooden construction, with its inclined roof, which is generally taken for the universal model of the architecture of all nations, could not have given birth either to that of Egypt or China; but it was indubitably the type of that of the Greeks, amongst whom, as will be hereafter shown, the art of finding a model at once solid and varied, learnt to transfer to stone the forms of the carpentry, and to appropriate, by a happy imitation,

the first essays of necessity. This kind of construction must have originated in an agricultural nation.

The principal intent of this article is directed to the art of architecture in its limited sense, and that of the Greeks having a particular claim to this name, it is a knowledge of its principles, origin, progress, nature, and history, which ought to be more strictly the object of our researches. Without wishing to depreciate the merit of the architecture of other nations, it is impossible not to assign to that of Greece a superiority over all. Independently of its particular advantages, it alone merits the name of being an art, as it is reduced to fixed and just proportions, which may be sought in vain in the architecture of other nations. Again it only has claim to this title in producing in its first essays a simple, rich, and varied model, the imitation of which afforded the means of bringing the art to the perfection it attained.

It is granted that the architecture of other nations is equally the offspring of nature; but it is in vain for any to contend with the Grecian for superiority. This architecture does not contest for eldership, nor the advantages of richness and ornaments; but there must be perceived in it a kind of predilection of nature, in the donation which it appears to have made to it of all its greatness. Above all, a pre-eminence of beauty is remarkable in it, at which the others cannot arrive, because they can never acquire those rules and proportions which form its principles, and because they can never enjoy, from the nature of their origin, the same happy means of developement.

It was, incontestably, carpentry which served as a model to the Grecian architecture; and it must be

admitted, that of the three models which nature presented to the art, this is the most perfect and elegant. In it both unity and variety are amply displayed. The subterrains indeed already seemed to present to the art a model so imposing and accomplished, as to dare imitation to undertake any thing beyond it. In the tents also the art found plenty to imitate; but this model being deficient in solidity, the architecture derived from it could not acquire that most desirable quality, and of which the appearance is as necessary as the reality. Extreme heaviness and lightness were the consequent results of these two imitations. There is too little to imitate in the first model, or rather there is nothing to imitate, since there is not even a change of matter; and in the second, the imitation could not be otherwise than vicious and puerile, because there is too great a difference between the matter of the model and that employed in the copy. The art must necessarily have been impoverished in an imitation where there could be so little analogy to its model. Again, in the subterrains there reigned such a monotony of forms, as could not but communicate to architecture the perpetual repetition of the same parts. And as the tents easily admitted of being folded with the most capricious taste, this circumstance must have communicated ever-varying and uncertain forms to the art derived from it, and a fantasticalness in the details incompatible with that simplicity and correctness of ordonnance, which are so estimable in the Grecian architecture.

The carpentry of the Grecian architecture being at once solid and light, or at least susceptible of acquiring more or less of these two qualities, proved a fortunate

medium between the two former kinds of architecture. Wood, as Algarotti observes, was the most proper matter to furnish the art with the greatest number of modinatures, modifications, and ornaments of all kinds. By attention to the subject it may be seen, without difficulty, that from its nature it may be made to comprehend all the parts which can contribute to utility and beauty, and that the most simple wood hut contains the germ of the most magnificent palace. The subterrains no where offered any thing but plain surfaces. In those hollowed by necessity nothing was presented that could convey the idea of parts, relation, or proportion; and what was invented for their decoration, being only the fruit of caprice, and not of necessity, could not be reduced to rules. The art therefore derived from it, in its subsequent imitations, could not have rested on any scientific basis. Carpentry, on the contrary, every where produced just projections and elevations, a judicious distribution of parts in relation to each other, and of the bodies in advance or in retreat; and thus a rich and varied picture was offered to the eye. The art, in carpentry, was subjected to a reasonable employment of objects and parts, which could neither be transposed nor discomposed by the spirit of decoration, without doing violence to the beauties of the model which was imitated, and to the constant and invariable principles derived from it. The roof was an abundant fund of resources. But the art was not perfected by the first sketch of architecture; it afterwards required calculations, intelligence, a just disposition of pressure and resistance, an accord in the equilibrium of forces, and all the knowledge which was matured in after

ages, to raise it to its present eminence. It may then be affirmed, that without the aid of carpentry, architecture would never have been an art subjected to rules and proportions.

The source of the art being discovered, it should be followed step by step in its course, and the manner in which it was formed and composed in the bosom of nature, if the expression may be allowed, should be carefully examined, till it is traced to its greatest developement. The authors, whether ancient or modern, who have written on the art of architecture, furnish no authorities that can be depended on for the support of this theory. Their testimony does not accord with the principles which are about to be explained ; an appeal, therefore, shall be made to the objects themselves, the inspection of which will prove the truth of what follows.

Trees or pieces of timber sunk in the ground, were at first used to support a shelter of any kind, and were the origin of the detached columns which have since served as supports to the porticoes of temples, and are amongst the greatest riches of architecture. As trees are of a greater circumference at their lower extremities, and diminish in rising, the diminution of columns was suggested by it. This is strikingly illustrated in the Grecian Doric order. These timbers, consisting of trunks of trees planted in the ground, offered not as yet the idea of bases and pedestals, as is seen in the Doric order, which is without base. But in the course of time the inconvenience of this method was perceived, as it exposed the wood to rot; and to remedy this inconvenience, pieces of wood were placed under each support, to give it a better founda-

tion, and to protect it from humidity. This practice may be traced in some of the ancient edifices, in which the columns have no other base than a block of stone. But afterwards the number of pieces of wood employed for the base were increased, in order to give greater elevation to the supports, or to afford better security against the effects of humidity. From this multiplication of blocks as footings, sprung the torus and the other mouldings of the base, an origin far more probable than that of ligaments of iron, as imagined by Scamozzi and others. It is also more conformable to the nature of capitals, in which it is known that the same proceeding was employed. After beginning with a simple abacus several others were afterwards added, which were enlarged as they rose one above another, in such a manner that, as the base was to the column a kind of footing on which it rested more solidly, so the capital made a head more capable of receiving and supporting the weight and form of the architrave.

The architrave announces by its name what was its origin, and the way in which it was employed. This was nothing more than a large beam placed horizontally upon perpendicular supports, and was destined to receive the covering of the whole edifice.

The joists of the ceiling being placed upon the architrave, give the space or height of the frieze; and thus the joists are seen figured by the triglyphs in the Doric, and sometimes by the consols, as in the Composed Corinthian of the Coliseum. Vitruvius gives another origin to the triglyph, which he supposes to have been an ornament applied upon the extremities of the joists; but this opinion does not affect the pre-

vious theory. There may be observed on the ceiling of the temple of Theseus, at Athens, that at the meeting of each triglyph are found strong joists of marble, the disposition of which is conformable to the ancient construction in wood, and to the forms of carpentry. The intervals between the triglyphs were named metropes: they continued to be empty spaces for a long time, as may be learned from a passage of Euripides, in the tragedy of Iphigenia, where Pylades advises Orestes to creep through the metopes, and by that means to introduce himself into the interior of the temple. The empty spaces were afterwards filled and ornamented in different ways. Sometimes the extremities of the joists were covered with boards, together with the whole of that part called the frieze; and then the signs of this construction disappeared altogether from view; as may be remarked in several of the orders, although the place of the frieze has always been observed.

The inclined rafters of the roof composed the cornice projecting from the edifice, in order to secure it from rain. This great projection of the rafters of the roof may be remarked at the present day in the houses of Italy. And hence sprung the modillions and mutules which immediately support the roof, and which were for a long time made in an inclined plane; from which may be traced back their origin and ancient destination. They may be seen thus disposed in many of the antique edifices, and more particularly in the temple of Minerva, at Athens.

The roof necessarily gives the form of the pediment. This invention became the source of one of the greatest beauties in architecture. Cicero judged

thus when he said, "It is not to pleasure that we are indebted for the pediment of the capitol and those of our temples. Necessity suggested the form, for the better draining off the water; nevertheless its beauty is so very great, and it is become so necessary to edifices, that if a capitol were to be built in Olympus, where it was never known to rain, it would, notwithstanding, be necessary to give it a pediment." The pediment is, and ought to be, the form of the roof. The Greeks, living in an exceeding mild and temperate climate, had no need for strong and solid roofs to resist the inclemency of the seasons, or the duration or violence of the rains. The great inclination given to their pediments proves this fact. The Romans, situated in a less propitious climate, gave to their roofs a greater rise, and made them more solid. On going towards the north, high and pointed roofs will be seen, on account of the quantity of rain, and the abundance of snow, which falls in northern countries; whilst this form of architecture disappears in the south, where all the houses terminate in terrass. The height of pediments, which is always subordinate to that of the roofs, seems to have become a kind of visible measure of the different degrees of temperature.

In this anatomy of the wooden constructions may already be seen the disposition of the principal members of architecture. The posts which supported the main beam were at first placed very near each other, in order that the architrave, which bore all the weight of the construction, might not be bent or broken by the distances being too considerable. But to enlarge the intercolumnations as much as might be desired,

and to remedy the weakness of the beams, pieces of wood were contrived to fit in between the pillars of support in an oblique direction; so as to form a kind of strut, supporting and strengthening the architrave. From this contrivance arcades, with and without columns, had their rise. In wood bridges, in particular, these first operations of carpentry may be observed, which were the origin of arches, in the construction of which stone was afterwards substituted for wood. Nor is it to arcades only that carpentry has given rise, but to the different ways of employing arches, which themselves bear evidence of the imitations. Any one may be convinced of this by comparing the proceedings in the employment of carpentry in ceilings, in the various forms of arches, which took their figure and conformations from the inventions of cross timbers, and from being directed, as before shown, to support the beams.

Whether it was for a better defence against the injuries of the weather that it was devised to fill up the spaces caused by the intercolumnations, or to give greater solidity to the building, there were still sufficient openings left for doors and windows: and this was the origin of what by some is termed architecture in basso relievo, where engaged columns project from the face of the wall half or two-thirds of their diameters. The supports which gave birth to columns were at first cut in the form of the trunk of a tree; afterwards they were made square; and thus gave rise to pilasters, which are square pillars, engaged more or less in the thickness of a wall.

But to render habitations more wholesome, and to secure them against humidity, it was soon contrived

to raise these constructions of wood upon large beams or timbers, placed horizontally upon each other; the interior was then filled with earth and levelled. From this contrivance, pedestals, and continued basements, had their source. But as this elevation might become dangerous, and alter the solidity of the edifice, its height was stayed by spurs, which have since been adapted to walls of brick and stone. Thus also in the buttresses or water-breakers which defend the piers of stone bridges, and cut the current of the water, are seen the imitation of the stakes placed for the same effect in wood bridges, of which the famous bridge of Julius Cæsar, upon the Rhine, gives us an example. In following the traces of imitation, many other details may be discovered, that carpentry has communicated to architecture. In order to preserve the doors and windows of the primitive simple huts from the dripping of rain, small projecting pieces were placed over them, in the manner of a shed, hanging aslope from the wall, or in the form of a small roof, so as to throw off the water either in front or on each side of the opening; this was the model of the pediments and cornices, which have since ornamented doors, windows, and niches. The entrance of houses, above all, required such precautions: and these first inventions were continued in many countries till they became metamorphosed by art. There may yet be seen in many places over doors, large projecting roofs, convenient for different uses, which suggested, according to the climate, the various methods of decorating the entrances to buildings.

The horizontal and transverse joists have been the model for the compartments of ceilings, and all the

accessories of soffits. In Italy the ordinary method of forming a ceiling proves the incontestability of this origin.

There might be drawn from this unerring and fruitful principle, a number of other applications to the art of architecture, as in the variety of the proportions, the invention of the orders, the origin of the decorations, and a multitude of ornaments, such as flutings, grooves, foliage, leaves, &c. But it is unnecessary in this place to proceed further into the minute details of this subject, many of the applications made to ornaments being mixed and equivocal; and numbers of them, being the posterior inventions of pleasure rather than necessity, and not entering into the general system of architecture, ought to be excluded from this theory. It is sufficient to have proved that carpentry is the sole principle of the Grecian architecture. It remains now to be shown, that this imitation of the carpentry of the primitive constructions of wood, is one of the principal sources of the pleasure produced by architecture, the spirit of which can be neither renounced, changed, nor misapplied, without affecting the laws of nature and verisimility.

It is evident that of the two substances, stone and wood, which were employed, according to the different countries, in the first essays at constructing habitations for man; that wood furnished for the art of imitation the greatest variety of modifications and resources; and when stone was substituted for wood, the art, in preserving all the forms of the first substance, enriched itself still more by the suggestions of the latter, and so united the qualities of both. It may be further remarked, that it owes to the other arts

the combinations of proportion and beauty, the germ of which existed in carpentry.

There are many persons who blame this imitation of the first constructions in wood; they dislike that stone should be the representative of another material, and complain of marble being thus degraded by taking an inferior character, and being made to assume the poor and miserable forms of the first wooden buildings. They wish that the art should draw upon the properties of each substance for diversity of forms and taste. It has already been shown that in copying from stone itself, it has offered no pleasing forms to the art, no variety to the eye, no agreement to the mind. This is proved by the cold sameness, and tasteless elevations in the Egyptian architecture.

But it would show little knowledge of the essence of the arts, the nature of their power on the imagination, and the means by which they please, to take from architecture this agreeable fiction, and happiest of inventions; to deprive it of this ingenious mask, which associates it to the other arts, permits it to appear on their theatre, and to rival them in usefulness and excellence.

By this happy delusion, man enjoys in architecture a most delectable pleasure. Divest it of the imitative art, which is its most pleasing charm, and that pleasure is lost to him. The habitual fictions of architecture are in part the cause of the pleasure this art procures him, by the imitation of the primitive carpentry, which is at once delusive and real. Even if it were proved that this imitation does not exist, and that it is only an ingenious system, the product of after invention; yet all that can be drawn from this

proof is, that, though the early buildings were not so constructed, necessity demands that they should have been; and this would be conceding to the art the merit of having created a model, the imitation of which would convey still greater pleasure, inasmuch as the supposed primitive constructions ought to have been its prototype.

But it is not thus that things are invented: all the inventions of man are drawn from nature; and if this principle may be perceived even in those things, the traces of whose origin are lost, would it not be absurd to refuse it to an art which has faithfully preserved the happy tradition of its origin, and all the titles of its genealogy? But what is this pretended imitation? demand some persons who would throw off the yoke of rules. Is it not a sophism—a theory founded on precedent and custom? Nature ought to be the basis of all imitation; but can the first rude essays in the art of building be ranked amongst its productions? Nature does not produce the columns, capitals, and entablatures of habitations; all these, in their origin, are the product of an imperfect art: why then give the first rough sketches of the art as a model to it? If nothing in Nature presents a perfect type, the art can have no laws but what are imposed by itself; why then enslave it to those laws?

It is, doubtless, well known, that this imitation is much less absolute in architecture than in the other arts, which model directly after Nature; and it will shortly be seen that it is not precisely in this way that architecture ranked amongst the imitative arts, but by a law of imitation much superior to that which governs the others. Yet if this model is not in Nature,

as insisted upon above, she is nevertheless its author · for though not her work, it results from her laws; if not produced, it was at least suggested by her. This art and nature are so united, that to renounce the one would be to reject the other.

What is understood by the primitive wooden construction, which is asserted to be the model of architecture? And what is meant by the imitation of it? It is not a servile copy which the art has adopted; and though the period at which the model existed is distant, the tradition of it has been preserved, and the imitation is so much superior, as to leave the model far behind. The trees cut in the manner of supports, have not been, nor could they ever have been, faithfully copied. The invention of the orders and proportions has greatly surpassed the first type; indeed, to such a degree, that to return to the type would be endeavouring to attain perfection by conforming to that which is not perfect in itself. Thus, though this imitation of the first forms of the carpentry is an unquestionable truth, and demonstrated by architecture, there may still be found those that will not be prevailed upon to admit it. Though, however they may refuse to acknowledge in the matter and form of the early buildings the original model of the art, the judgment which presides in its composition, in the principles of utility, propriety, order, and symmetry of disposition, are not the less manifest. If we could not prove that the primitive wooden construction had been materially copied, is it not evident that the simple and correct maxims which directed its fabrication exist in the principles of the art? Nature certainly did not form the early carpentry; but

it guided man in its formation by a principle which could not mislead him, and which caused him to transmit its impressions in his first rude essays. This principle is to architecture what an axiom is to a moral. But if it could be established, that this is only a fictitious data, and a sign of convention, what would it amount to? The principles on which the carpentry in question is constructed, are to architecture what figures are to mathematics; and though this shell be abandoned, yet the principles on which it is established are so impregnable, that to attack them would be as idle as to combat a shadow, or to contend with a chimera. Those who have endeavoured to proscribe the imitation have succeeded only in corrupting it; and have adopted, in spite of themselves, and without perceiving it, the laws they conceived they had rejected, but which it is impossible to renounce. They repulsed the rigour of its laws, which, by setting limits to fancy, are the happiest safeguards of the art. But in their vain innovations, what have they changed or effected, since they have always preserved all the constituent parts of that which they reproved? All they have effected has been to transpose the parts, or rather to discompose them. They have changed simple combinations into those that are complicated, natural order into fantastical disorder, symmetrical forms into irregular ones, proportions easy to be understood into others difficult and compound; and yet they never could substitute other members for those of the early constructions. In these disorganizing proceedings it has been their mistake to suppose, that to confound was improving; to displace, inventing; and to innovate, making perfect. But

their efforts have proved, that a rude imitation of the laws of nature has the advantage over their unmeaning inventions, and that the imitation of the carpentry, real or fictitious, cannot be abandoned, without renouncing the principles which it has demonstrated to be strictly correct, and abjuring the natural causes which prompted and imprinted them.

Can those who make exceptions against the primitive carpentry, and reject its imitation, dispute the following maxims, which are manifested in its construction; viz.

That the strong ought to bear the weak:

The solidity ought to be real and apparent:

The employment of all the parts ought to be justified by necessity:

Unity and variety are constituents of beauty:

Nothing is beautiful in architecture but what is useful, or serves some end:

The parts ought to be subordinate to the total:

Symmetry and regularity are inseparably connected with order and solidity:

And that simple proportions are the most beautiful.

To these might be added other rules resulting from the first essays of necessity, and the subsequent operations of the art. Whether the existence of the type in question be real or imaginary, it is certainly the theorem of all these truths: and who would proscribe its imitation, if it be a visible rule, and a material and evident example of the principles which constitute architecture? The excellency of the imitation is clearly proved by the reality of the model, the necessity of the copy, the utility of its principles, and the pleasure man finds in it. The artist, unless

he entirely change the model, ought rigorously to follow the rules and laws which it prescribes. It cannot be followed in certain parts and abandoned in others; obliged to be consequent in the imitation, it ought to be conformed to in all that it exacts, or be entirely renounced. It is only by placing the model before him, and tracing the object of his imitation, that he can hope to please. If he happen to lose sight of this rule of conduct, or pass an instant the bounds of an exact imitation, he may be seen falling by degrees into a disorder and confusion of ideas which render him the sport of the most extravagant and false combinations. No more clear and precise ideas present themselves; all is unnatural: the forms are continually changing; the signs of which alone remain, and become at last unintelligible. The columns are no longer the natural supports which the proportions between them, and that which they have to sustain, ought to make apparent; they become objects that might be dispensed with, the frivolous accessories of a needless ostentation, of which the disposition appears no longer to appertain to architecture. The entablatures are no more the representation of the parts which compose the roof, but are broken and turned in a thousand ways; the pediments also cease to represent the gables of the roofs; straight lines are succeeded by curved surfaces of all descriptions; and the plans of edifices being perverted, unity, regularity, and proportion no longer exist. All the unskilful forms that the pencil can produce are realized in durable substances, and the strength and skill of workmen are prostituted to a warped imagination. The ornaments absorbing the members, and

the accessories commanding the principal, there can be no law between the parts, nor correspondence between them and the total; and the construction itself must disappear under this profusion of licentious decoration. From this destruction of the principles of architecture, and introduction of confusion into it, the art would become a puerile exercise for the artists, and an enigma for the generality of mankind.

On the contrary, the edifices, both ancient and modern, that possess the most general and least contested reputation for beauty, are those in which this scrupulous imitation of the primitive type has been most carefully observed. The esteem in which they are held depends on the degree in which the principles of the model have been applied. There remains in France, says Laugier, a most beautiful monument of the ancients; this is what is called at Nismes the Maison quarré. The beauty of this edifice is admired, not only by the connoisseur, but by those also who are ignorant of the rules of the art. Why? Because the whole of it is according to the principles of the early constructions. A prolonged square, where thirty columns support an entablature, and the roof terminated at the two extremities by a pediment, are all that it presents; exhibiting a degree of simplicity and nobleness that strikes all beholders.

In thus retracing the history of architecture to that point of which we have just been speaking, we have discovered only the crude types which constitute, as it were, the skeleton of the art. The concurrence of other arts, more direct imitators of nature, was necessary to bring architecture from the point where it

would have rested without them, to that degree of perfection in which it was found among the ancients. Before this necessary junction with the arts, architecture resembled the celebrated statue formed by Prometheus, that waited only the torch of Minerva to communicate to it movement and life. It was from this union that it received animation, and was made to participate in those riches which the arts had derived from their common imitation of nature. In the appropriation, however, of these riches, and the choice and comparison of these new models, of which architecture previous to that time was entirely ignorant, considerable knowledge and judgment was required. Restrained to the forms commanded by necessity, it followed only the rude proportions that its limited knowledge enabled it to perceive. It could not, however, rest at this point amongst the Greeks, as it has done with many nations where it is yet in its infancy. Greece, fertile in genius, could not be an unfruitful soil for any art. Blessed with a mild and beautiful climate, and enjoying political and civil institutions the most favourable to genius, sculpture was marching at a slow but sure pace, having followed a route until then unknown. Raising itself by degrees from the most shapeless signs to the principal dimensions in the termes, from the termes or hermæ to the figures called dedales, it at length attained a tolerably accurate knowledge of the true proportions of the body of man, in the imitation of which architecture discovered, if not a fresh model, at least a new analogy of imitation. In the application of this system of natural proportions and relations, a similitude of principles was discovered, by the

appropriations of which the art became more immediately the adopted of nature, and enlarged its capabilities of effective design.

In the formation and imitation of types, architecture knew only the simple dimensions of necessity. In its progress towards perfection, a model of proportions applicable and conformable to its first disposition became necessary, which, without contradicting the spirit of its original, would embellish the form. The application of human proportions was eminently calculated to answer this purpose: it afforded such means of perfecting the first essays of the sketch, that one is almost tempted to regard the excellence which followed, as the result of previous computation and reflection, rather than the concurrence of successive and unforeseen causes. Nevertheless, experience proves that the principal inventions of men are the result of a fortunate application of fortuitous discoveries. To this imperceptible conjunction of causes, which were beyond the reach of human foresight, and which determined, in a great measure, the destiny of the arts, architecture was subordinated more than any other art. In adverting, however, to the commencement of the arts amongst the Greeks, it may be remarked of them generally, that they contained in themselves the seeds of perfection; nor is it easy to discover any cause that could have operated to prevent them from arriving at maturity. The rude representations of Thespis were preludes to the master-pieces of Sophocles; and the architecture of Greece, unlike that of modern nations, which received from the Gothic a vicious principle, advanced from its origin, unmarked by vacillation, and without retro-

grading in that course which naturally led to perfection.

Architecture, constituted and founded upon the types of carpentry, offered to the art of imitation a fertile field, which required but more favourable circumstances, and a more fortunate cultivation. The art of proportions ought to perfect the work. The ancients were sensible that the forms of the carpentry could be improved by bringing them to points of comparison of another kind. Estimating the form of man as the most perfect in nature, they perceived that in imitating the plan, disposition, conformity, and the means that nature had employed in its most perfect work, the art would, in some measure, become its rival. Believing they had discovered the secret by which nature pleases, and from whence she derives her beauty, they conceived that an edifice disposed after the same spirit and principle that nature itself had pursued, would be alike beautiful, and please from the same reasons. Thence an edifice was regarded as a form which ought to have its members, divisions, and parts subordinate to the total. Observing that nature has disposed the form of man in such a manner, that there exist a necessary correlativeness from the smallest part of his body to the whole, they would not from that time admit in architecture any thing which could not, as in nature, be justified by a necessary employment, or was not dependent on the general order.

It was on this plan that all the forms invented by necessity were put in order, and consecrated by the imitation of types, the employment of which had not as yet found a basis in reason and enlightened senti-

ment. Hence that happy division into three parts, that ternary distinction, which may be remarked in the form of the original model, was afterwards founded upon nature itself, in the works of which this same division is generally adopted. Architecture, says M. D'Hencarville, is composed of three parts; the column, entablature, and pediment, to which a basement has since been added. Each of these parts are subdivided into three others. The reason of this division is, that it contains the greatest number of proportions that the eye of man can embrace at once, and may observe with attention, without being fatigued.

Nature has given to sculpture a determined measure of relations, a scale of proportions of the human form, which, whether it be taken from the foot or the head, will serve as a module to the whole figure: it rules the slightest shades of proportions, in establishing a constant accord of the parts, independent of the variety of the models, and the errors of the sight. Architecture also has created for itself a scale of proportions of a similar nature, which in the different ordonnances, was the inferior diameter of the columns of the order employed. From that time an edifice became a kind of organized object, subordinate to constant laws, in which it found the principle and reason. It made a code of proportions which assigned to each part its measure and ratio, according to the design of the total; connecting in such a manner the whole with the part, and the part with the whole, that it placed them in a reciprocal dependance, and secured to them an inviolable accord. The study of the human form having been investigated in all its

varieties, caused sculpture to perceive the differences of age and nature, which form the diverse manners that Polycletus has described in his treatise of symmetry, and of which the antique statues have preserved to us the visible rules. Architecture has formed for itself a similar expression of character in the invention of the orders, which are reduced to these three: the one expresses strength, the other elegance, and by the union of these two qualities, the third exhibits the expression of nobleness and majesty.

Such was the progressive advance of architecture. It was in assimilating itself to another model, that it succeeded in producing one much more perfect than the first. It is useless to remark that it never traces materially upon the model of the human form, but only makes an intellectual copy. The imitation is not positive, but figurative. It is not the form that architecture appropriates, but the proportions and principles that are contained therein. When Vitruvius tells us that the Doric order was made in imitation of the body of man, and the Ionic in that of a woman, it must be understood that this was an imitation of analogy, and not of resemblance. Hence he gives us to understand, that in one was imitated the neglected and naked simplicity of the body of man, and in the other the delicacy and ornaments of that of woman. But when he endeavours to establish a similitude between the column without base and the naked foot of man; between the ornamental base of the Ionic, and the elegant sandals of women; between the folds of their dress, the ringlets of their hair, and their bracelets, and the Ionic volutes and flutings, the comparison is pursued too far. It becomes an abuse of analogy

that banishes reason, or at most an ingenious allegory, intended to disguise truth, but which tends rather to alter and render it unnatural. Others, reversing this order of imitation, have pretended to see in the capital of a column, the head of a man, and his body in the shaft; and have attempted by a fictitious and absurd interpretation to prove the truth of their hypothesis.

It is evident that man, in seeking a model of proportions to apply to the rude delineations of carpentry, could not possibly have found one more sensible, or more within his power, more analogous or happy than the human form. This analogy is so natural, that in praising the human figure, it is generally compared to a well-disposed edifice; and architecture pleases the sight in proportion to the greater degree of approximation which it has made to the principles and proportions of nature. Vitruvius plainly tells us, that a building cannot be well disposed, if it has not this proportion and relation of all the parts with regard to each other, which are found in those of a well-formed man.

It was in this living book of proportions, which the artists of Greece always kept in view, that the ancients formed those happy combinations, just application of means, and delicate shades of character, with which they enriched architecture; and by these means, this art, which is apparently so little susceptible of fixed principles, became nevertheless, not only the creator of its own laws, but also gave them to the other arts, of which it rendered itself the moderator. The possibility, however, that these principles and laws of proportion, which were intended only to prevent the excesses of the imagination, might become

a chain to the art, by a too slavish adherence to them, was early perceived by the Greeks. They were sensible, that if an exclusive authority were given to them in all cases without bounds, the art would languish in fetters which it had forged for itself. The merit of discerning the degree of liberty that was allowable to architecture, and of giving it that happy constitution, which is equally distant from the licence of Asia, and the absolute system of Egypt, is undoubtedly due to the Greeks. But this judicious medium must have been the result of the fortunate concurrence of the best moral and physical causes; and the perfection of the art must have depended on the nation which invented it.

It has been shown that architecture, depending only on a system voluntarily established, and exercising an imitation in some degree metaphorical, might have found itself subjected to laws which would have been more tyrannical from the circumstance of their being arbitrary. But it may be observed, in addition to what has been previously remarked, that as nature exhibits occasional exceptions to her general laws, it is understood that the rules drawn from her temple, and applied to art, may be equally modified in their details. It should also be remarked, that the proportions of the human form, although fixed and unchangeable in the nature of their existence, are subjected to much variation in the different members of the species; and sculpture, in its most perfect imitation, was itself governed by these variations. It was much more congenial to the genius of architecture to follow the spirit of nature, than to subject itself to a servitude, the effects of which would

have been peculiarly detrimental to the art. Hence it may be seen that the rules of modinature and relative proportions ought to be subordinated to the maxims of a superior order; and instead of being the governing principles, they should always be subjected to the order which they are intended to embellish. By constantly referring to nature in their endeavours to enrich the capabilities of architecture, the ancients discovered some of the means whereby the former affects man with sensations of delight, and which they sought to appropriate to the latter. Until then they had perceived only a slight intimation of the resources of architecture, but now they distinctly saw, and comprehended them to their full extent, and their principal object of research became a correct knowledge of that which affects the mind most agreeably, by the interposition of the sense of sight. In their endeavours to attain this desirable end, they perceived that, notwithstanding the intimate connection which exists between the mind and the senses each of them is nevertheless independently susceptible of pleasure; that the pleasure of sight is peculiar to the eye, and results from certain impressions dependent on the relations which nature has produced between the object and the organ. From the knowledge of these principles two distinct studies became necessary to perfect the art. The one was that of optics, or the science of vision in general, which accounts for the modifications of the rays of light in their passage through the eye, explains the causes of distinct and confused vision, and also the effect which distance and height has upon different objects. The second was that of harmony, named eurithmy by the

Greeks. The art of harmony consists in a general knowledge of the laws of nature, their purposes, the means by which they attain their ends, and the relative effects of disposition, form, and proportion.

By generalizing more and more the idea of its model, architecture extended its sphere of imitation. It was no longer exclusively indebted to the early constructions from which it originated, nor to the form of man from which it modelled itself, but to the entire area of nature, which had become the type of its imitation, and its directing genius. The happy form which it drew, from the imitation of carpentry, constituted, in a manner, the placing of the bones of the art; the analogical imitation of the human form, by the study and application of its proportions, furnished this skeleton with that just relation of the parts which was essential to its harmony. The general appropriation of the principles of order and harmony which exist in nature, and from which the mind derives its ideas of beauty and greatness of design, became the animating principle, by the exercise of which, was formed an art no longer the mere copier or imitator of nature, but its rival.

It is evident that architecture, which is apparently more subjected to matter than the other two arts, is in reality more ideal, intellectual, and metaphysical, than either of them. We have seen that nature furnishes it only with analogies. It rather compares itself to its model, than imitates it; it does not follow after, but goes by its side; and whilst it does not materially copy the forms with which it is conversant, it appropriates the harmony and general effect which they exhibit. Studying the cause by which that

harmony and general effect are produced, architecture assumes an originality even in its imitation, and becomes the competitor of nature, whose laws of proportion, of harmony, and of effects, are interwoven with the study of its progress, its genius, and its means. The other arts are presented with models which they imitate or rectify: architecture created its own. The order of nature was the fertile field of its active researches, and from the almost infinite variety of form and design which are manifest in its spacious area, it has deduced its principles of order and arrangement, by the fortunate application of which it has conferred upon man the blessing of a secure retreat from the inclemencies of the weather, combining comfort and convenience with ornament and taste; and has given to nations their temples, their asylums, and their palaces.

If then architecture is an imitative art, it is not from its having embellished the rude forms that necessity had dictated in the dwellings of the earliest race of man; but it is because in prescribing laws to itself it studied the sublime code of nature, and modelled its own in the spirit of that of its great prototype.

The rules which architecture has given itself, rest consequently on a double basis; that of the positive imitation of types, and that of the ideal imitation of nature: the one submitted to a method, and the other superior to all calculation. The first has never been servilely followed by the ancients; and perhaps there cannot be found two antique edifices where the proportions of the same order are precisely similar. This circumstance, said M. D'Hencarville, is agree-

able to the ideas of the ancients, according to whom the edifices were not made for the orders, but the orders for the edifices; and it appears consistent that they should be subjected to the particular character that each structure is intended to express. Thus if some of the antique remains, which have escaped the ravages of time, were judged after those rules which we believe to be derived from them, those masterpieces of architecture would very often be considered only as exceptions, the real beauty of which might be very great: it is because we are not aware, that it is not by our scanty rules that those sublime productions must be judged; but, on the contrary, it is our rules which should be judged by those which have been followed, to produce such examples of perfection. To construct according to rules requires nothing but memory and practice; but to execute after those great maxims, to invent after those principles of imitation, and to draw from them all the resources which they can possibly furnish us, requires genius.

A BRIEF REVIEW OF THE PROGRESS OF THE ANTIQUE ARCHITECTURE, FROM THE EARLIEST PERIOD, TO THE LAST CENTURY.

The principles of the arts being the progressive results of the researches of men, those antique remains possessing the greatest merit, must necessarily have been erected at a great period of time posterior to the first application of those principles.

The most distant period of Grecian history, is that when it was divided amongst petty princes. This is confirmed by the poems of Homer, in which is given the first indication or description of their palaces at that remote epoch. If it be asserted that the descriptive matter contained in the poem may be fictitious, the poet must nevertheless be acquainted with models, whence he derived his information. The palace of Priam is described in the Iliad as a spacious edifice, the lower part of which presented covered porticoes of stone, over which were fifty richly decorated chambers. At the opposite extremity of the court of this edifice were erected twelve other chambers; the former for the use of the sons, and the latter for the daughters of that Prince.

The Doric order, which was doubtless the most ancient, does not indicate any epoch more certain. The circumstance of its name is insufficient to prove that its invention was due to Dorus, son of Helenus, King of Achaia and Peloponnesus. Perhaps it received its name by having been employed in the famous temple which this Prince (according to Vitruvius) had built in Argos, in honour of Juno. It might have originated amongst the Dorians, among whom, it appears, that the Doric order was held in great estimation long before it had spread itself over the rest of Greece. However, it is evident that the most ancient of their edifices, or those at least which exhibit the most striking marks of antiquity, are of this order; the invention of which must have preceded that of the others. (*See* Doric Order.)

It is certain, however, that in the century of Alexander the Great, the three orders which constitute

architecture, had attained, in a great degree, the perfection of which they were susceptible. Moral and physical causes combined to bring the art to this point. Liberty, love of their country, and the desire of national fame, had rendered Athens the common centre of the arts and sciences. The defeat of the Persians at Marathon, and other noted victories, had procured peace to all Greece. The space of time which preceded the Peloponnesian war, witnessed a general developement of talent: it was at this epoch, observes Diodorus of Sicily, that sculpture was carried to its highest point by the chisel of Phidias. Philosophy, eloquence, in fine, all the arts and sciences, were seen at once disputing for pre-eminence. It was then that they commenced to rebuild the edifices that the Persians had thrown down; the ruins of which had been preserved by the wisdom of the state, in order that this spectacle of misfortune and desolation, might furnish an eloquent lesson to the Greeks, of the perils which always menaced them. It was not in fact until after the flight of Xerxes, that this general restoration of the structures, and the re-construction of Athens was begun. Such was the epoch of the grandest and most beautiful style of architecture. If the monuments of this age are compared with the statues of the same time, it will be seen that there reigned the same character of grandeur and energy; that courage and stateliness, which the circumstances of the times could not fail to imprint on all the works of art: for the arts, being the works of man, are always the true representatives of his state. The edifices of the Doric order that were then raised, exhibited this air of heroism and manly energy, the

cause of which is seen in the political position of Greece. This order appears to have attained at Athens, near the time just mentioned, the state approaching to perfection, and the medium between the two excesses.

The Ionic order (to judge from remains in that city,) had also attained nearly all the grace and delicacy of which it was susceptible. The Grecian architecture passing into Asia Minor, acquired that luxurious taste which characterizes the country. In this voluptuous climate it lost a part of its original character; and the presumed elegance which it acquired, was by the sacrifice of several attributes of solidity. The scrowl of the volute was injured by the vigorous outline of the abacus and echinus. The columns of the temple of Ephesus are covered with ornaments in relief; and thus the sculpture insensibly softened the manly stateliness of the construction. (*See* Ionic Order.) Whether the perfection of this order is due to the Ionians or to other nations is of little consequence; it is certain that, in the temple of Minerva Polias, the construction of which is referred to the time before mentioned; this order had attained great beauty, lightness, and exquisite taste of ornament.

Callimachus had already preceded the age just spoken of; and consequently the Corinthian capital required nothing from the genius of the following centuries for its decoration, as experience has proved. In substituting the acanthus plant for the olive and laurel leaves, or the nymphæ of Egypt, Callimachus seems to have imposed on all ages the necessity of imitating this beautiful distribution, the idea of which

was fortuitously suggested to himself. (*See* CORINTHIAN ORDER.) Nevertheless there remain few monuments really Greek, of the Corinthian order, which can be traced to the time of Alexander, or which are worthy of being imitated.

When architecture, with the other arts of Greece was transported to Etruria by the Pelasgi, it appears, according to the general opinion, that the Doric order reigned alone in Greece; at least it is the only one that the Etrurians have employed. They stripped it of its tryglyphs, and gave to it a base. It was under the name of Tuscan, that the Romans received these innovations in the Doric order; which the moderns have since sought, by false distinctions, to constitute a distinct order. (*See* TUSCAN ORDER.)

If the monuments of history, and the remains of many very authentic edifices in Etruria are consulted, it will be seen that the art of building developed itself in that country under the greatest and noblest of forms. But if the analogy of the other arts with architecture be examined, the latter appears to have rested in the same state in which it was in Greece, previous to its introduction into the former country; and had not acquired those valuable shades of character exhibited in the three orders. If, however, in its origin, the architecture of Etruria identified itself with that of Greece; in the decadency of this nation, it mixed with the taste afterwards displayed at Rome.

The early works of the Romans were executed by the Etrurians: it was to them that Tarquininus confided the construction of the famous sewer, an immense work; in which has since been seen an assured presage of the greatness towards which

architecture had advanced from its early essays, and with the whole extent of which it appeared, even then, quite conversant.

Augustus knew the importance of promoting the arts, and he employed the extent of his power to aid their progress. Titus Livius calls him the author and restorer of the temples. The encouragement given by this emperor, caused all the great masters of Greece to come to his capital; and under his reign architecture attained a high degree of perfection. The Pantheon, the finest monument that remains of Roman magnificence, was built by Agrippa, son-in-law to Augustus; who prided himself in embellishing Rome with an innumerable variety of superb edifices. He introduced the thermæ, and caused a great number of fountains, temples, &c. to be constructed.

The spirit for these great structures again revived under the successor of Augustus. Nevertheless, under Tiberius, Caligula, and Claudius, taste had greatly degenerated. Nero showed less predilection for the arts than for cupidity. Nevertheless, his reign was favourable to the employment of talent in the erection of public edifices. Severus and Celer constructed for him the palace called the Golden Mansion, the magnificence of which has never been equalled; all the pomp of decoration was exhausted in its construction; and, in the midst of so much grandeur, all that could be despised was the possessor.

Under the happy reign of Trajan, architecture resumed its former correct taste, a circumstance principally owing to the character of this great emperor. The triumphal arches, the column, and forum, built by this prince, attest by their great splendour the

degree of superiority to which this art had risen under his patronage. The architect Apollodorus, had the greatest share in designing the edifices which immortalize the memory of Trajan. It was this architect who superintended the erection of the famous Column, at present existing, being the master-work of this age, and perhaps of the Roman empire.

Adrian and Antoninus encouraged architecture : the first exercised it himself. Marcus Aurelius practised drawing under Diognetus. Antoninus Pius built the Lanuvium, a villa or country seat, after the antique : the remains of which prove, even, at the present day, its grandeur and magnificence. Nevertheless, as Winckelmann observes, the art was then approaching to its decline; the splendour which it threw around it at this epoch, resembles the bright glimmer of a lamp before it dies away. Under the emperors which followed, it was seen first to decline and then to disappear. Greece no longer possessed those privileges which it had previously enjoyed. The Greeks, at this early period, had forgotten their own language, and few amongst them could read and understand the best writings of the Ancients.

The arch of Septimus Severus made one of the remarkable epochs of the commencement of the decadency. It is difficult to conceive how sculpture could have fallen in such a manner, so soon after the time of Marcus Aurelius. The arch, vulgarly called the goldsmith's, presents nothing of the character and form of good architecture. The profiles are imperfect; and the ornaments cover and overcharge the members.

The predilection of Alexander Severus for the arts,

revived architecture for some time; but he could not prevent it from sinking with the fall of the western empire. It is to the reign of Gallienus, however, that the date of the total annihilation of the arts is generally fixed. The arch of this prince proves to us, the disgraceful state to which they were then reduced. Nevertheless, the genius of architecture was not entirely extinct; at least it appeared to have survived the ruin of the other arts. In an age when there was not a statuary existing, Dioclesian, in his Thermæ, displayed a greatness, which, whilst surveying the prodigious remains that have descended to us, demands our admiration even at the present day. Dioclesian's palace at Spalatro, also proves what efforts architecture was then capable of. It is nearly to the same epoch, or to the time of Aurelian, that the vast constructions of Palmyra and Balbec, in Cœlosyria, are ascribed. Notwithstanding the imperfections of taste, and the viciousness of the details, we cannot help being astonished at the grandeur of the plans, the boldness of the undertaking, and the resources which have been employed, in the erection of these great works.

It might be asked why architecture, deprived of the aid of the other arts, supported itself alone, and for such a length of time without them? Why, after having being raised with and by them, it did not immediately follow them in their fall? There may be more than one reason assigned. Inseparably connected with the prosperity and comfort of man in civilized countries, and retaining a hold upon the public mind in the erection of temples, &c. architecture survived, though not without injury, the operation

of those political causes which caused the destruction of the statues, the effacing of the paintings, and the conversion of the bronze and metal statues of the deities into money. Statues were no longer required; but it was still necessary to erect edifices, and the ancient temples were stripped of their ornaments and columns, to embellish the edifices devoted to the new form of worship. To necessity, therefore, architecture is principally indebted for its preservation; whilst sculpture, witnessing the destruction of its finest forms, drooped its head; and, together with its kindred art, painting, (which received but little encouragement amid the prevalence of such a depraved taste,) sunk into disrepute and temporary oblivion. Such were the principal causes of the inequality in the duration of these arts. But a common destiny soon afterwards overwhelmed them. The translation of the seat of empire to Byzantium, in dividing the riches of the arts and the power of the state, caused a mortal stroke to one and the other. Vainly did Constantine endeavour to raise this new metropolis to an equal eminence with Rome, which he had stripped. All the efforts that he made to embellish it with similar edifices, taught him that those productions which result from the highest cultivation of the human faculties, are not at all periods subservient to power.

Italy being abandoned to the fury of the Visi-Goths, they destroyed all that Constantine had left. A general ruin, buried in the dust, the structures which had been the pride of Rome. All the edifices afterwards constructed were from the precious remains that ignorance or avarice had gathered from

all parts. A disgraceful ignorance of the appropriate application of these fragments, occasioned a confusion in all the members of architecture, and completed, by this medley, the unnatural perversion of its principles. The columns were collected and employed as pillars; upon which were confusedly extended the different entablatures, placed at hazard. Arches were formed, supported by columns, and from their inability to construct platbands, they were to supply their place. Architecture also lost the division which constitutes its nature; and it descended from abuse to abuse, until the idea and remembrance of its types were almost forgotten. There was no longer any remedy: it fell into a real chaos; and from the total ruin arose what is named the Gothic style.

In the midst of the darkness with which ignorance had for many ages covered the finest countries of the earth, some rays of light discover to us that the antique system of architecture was not entirely lost. The spirit for great undertakings was not altogether extinguished in Italy. The attentive observer, in travelling through those countries, (with whose records the history of the arts is immediately connected,) will perceive, in different situations, the scattered monuments of architectural genius, which serve as guide-posts to direct the historic traveller.

In the fourth century the Christians abandoned their retreats in the catacombs, and raised themselves basilics, or spacious edifices divided into a nave and two side isles by two range of insulated columns, and terminated at the extremity by a semicircle. There soon appeared in Rome St. Giovanni Laterano,

St. Pietro, St. Croce in Gerusalemme, St. Lorenzo, and St. Agnese, which were the basilics erected under Constantine; St. Maria Maggiore and St. Vitale, under Constanzo; St. Paolo, under Theodosio; St. Sabina, St. Pietro in Carcere, and St. Giovanni e Paolo, under Valentiniano. In the sixth and seventh centuries the church of St. Sofia, at Constantinople, was erected by Gustiniano, and forms the only production of this kind that exists in the empire.

The tenth and eleventh centuries witnessed in the church of St. Mark, at Venice, the dawn of that correct taste which afterwards shone so brightly.

Some improvement in taste began to manifest itself also in the different cities of Italy: in 1013 the church of St. Miniati was commenced. But the principal edifice of this century was the cathedral of Pisa, built in the year 1016 by Buschetto, of Dulichium, a Grecian architect.

In the twelfth century, a high tower was erected adjoining to the cathedral of Pisa, to serve as a belfry. This tower is well known by the singularity of its inclination, which is owing to the insufficiency of its foundations. In its construction little progress can be discovered to have been made in architecture.

In the thirteenth century, Lapo, a Florentine architect, built in Tuscany the church of Assisi; and Fuccio, another Florentine artist, constructed at Naples the castle of Uovo. Niccola of Pisa, of the same country, and in the same age, erected at Bologna, Padua, and Venice, many esteemed edifices. The belfry of the Augustines, in the first of these three cities, offers interesting details. His greatest undertaking was the church at Padua, dedicated to the

patron of that city: it is less remarkable for its architecture, than for its sculpture in basso-relievo, the greater part of which is from the hand of this architect. Nevertheless, the church of the Trinity, at Florence, was that which of all his productions was most esteemed by Michael Angelo, who was one of the greatest admirers of the talents of this artist. Architecture had not as yet entirely emancipated itself from the chains of barbarism and ignorance. Arnolpho di Lapo built the church of St. Croce, and gave designs for the costly temple of Santa Maria del Fiore. There still remained great efforts to be made before they could approach in the slightest degree to the taste, simplicity, and beauty of the antique architecture. At this time a strong emulation seemed at once to animate all the cities of Italy. The church of Santa Maria Formosa was constructed at Venice, by Paolo Barbetta, some part of which is in the antique taste. Several edifices were erected at Bologna; and the admired chapel of marble in the church of St. Maria Maggiore, at Rome, was built about the year 1216, by Marchione, architect and sculptor. The whole of this epoch indicates an animated combination of talent and energy to raise architecture from the abyss into which it had fallen.

But these indications of reviving taste did not extend beyond the borders of Italy. In all the spacious constructions which were raised at this time in the rest of Europe, we only behold an excessive passion for that which was strange and marvellous, and a profusion of ornaments, without choice, rule, or taste; amongst which class may be placed the cathedral of Strasburg, a production of the thirteenth or

fourteenth century, and one of the greatest edifices which at that time had been undertaken. It was constructed by Erwin, of Steinbach. The total presents a strange union of extended, and at the same time trivial and ridiculous ideas.

In the fourteenth century Charles V. continued the erection of the Louvre, which was commenced by Philippe Auguste; and then he undertook the palace of St. Germain-en-Laye, which the English augmented and embellished under the reign of Charles VI. In the same century also, William Wykeham, an Englishman, presented to king Edward III. designs for the construction of Windsor Castle. He likewise erected several edifices in Oxford. At this time Giovanni, of Pisa, in Tuscany, constructed in that city the Campo Santo, in which, although of so late a date the Gothic taste prevailed.

The basilical form of the primitive churches is very advantageous. We discover their total at the first glance, and at whatever point we may be placed; presenting a noble and elegant appearance. The insulated and equally-spaced columns fill their office of supports with admirable effect, and give an increased apparent extent, which at each movement of the spectator presents to him different perspectives. This it is which constitutes the principal and positive beauties of architecture. Nevertheless, these edifices, which were derived from the antique basilicas, convey but a faint idea of the perfection of their model.

As soon as one of the ancient basilicas had passed to the service of a church, it became an absolute rule to the architects, to give to churches the basilical form, and they stripped and destroyed the most mag-

nificent remains of antiquity at Rome, for their embellishment. Its columns were employed at hazard, and without regard to the character of the orders, retreat of their shaft, relations of their parts, or suitableness of their bases, capitals, and entablatures. There no longer existed the least degree of taste. Necessity alone directed those who were employed in these constructions; and it was considered a meritorious work to destroy the inimitable remains of antiquity, in order to employ its fragments in the erection of these new temples. When they had not under their hands great masses to form entablatures, they had recourse to the expedient of passing arches upon the heads of the columns; they also believed that these arches diminished the weight of the masonry, and rendered the construction lighter. The form of these arches was always semicircular at Rome; and they were esteemed so convenient, that they were adopted even at the exterior of edifices, to sustain other constructions, as if in air; and to give to them a greater exterior projection. This practice continued for a considerable length of time, and was extensively employed, as may be observed at the palace of Venice, castle of St. Angelo, Vaticano, and in many other places.

We may remark the great use made of columns at this time: they abounded in Rome. But it is much more worthy of attention, to examine whether they have been constantly employed as the essential supports of structures. To see the use made of columns at this period, we have but to regard the belfries of the churches erected at this early date, the names of which have been before enumerated. We there per-

ceive that they always sustain arches. But what kind of columns were they? Mere spindles, without elegance, or the redeeming merit of appertaining to any order. All the belfries of this time resemble high square towers of several orders of semicircular arcades, supported by small columns surmounted by cornices cut in a similar manner to the teeth of a saw, and ornamented with small pieces of marble or glass of different colours, placed here and there. The most profuse employment of columns is made in the cloisters. Witness those in Rome, of St. Lorenzo fuori le mura, St. Sabina, Chapter of St. Giovanni Laterano, and St. Paolo; where we behold small slender columns, sometimes coupled, at other times insulated, supporting arches which bear the great walls of the edifice.

It cannot be doubted, but that these embryos of columns have been wrought expressly for the use to which they serve, for they are all alike. Their capitals are rudely and irregularly formed; some of their shafts are spirally fluted, and others have their flutings and shaft spirally twisted. Such were their futile attempts at beauty, and elegance of form and design. These small columns were placed, as an excellence, even in windows, which at this time were small, narrow, and terminated by a semicircle. Those of St. Agnes, St. Clemente, and St. Lorenzo, are so small that they resemble loop-holes. These, however, are without columns. Columns were better employed at this period in porticoes than in any other part; there they had architraves, as is seen in the porticoes of St. Lorenzo, St. Giovanni e Paolo, St. Giorgio in Velabro, and St. Vitale.

The other ornaments which were most in fashion at this time are really singular. In the cornices of churches, porticoes, belfries, and other constructions, were placed pieces of stone or brick cut to very acute angles, resembling the teeth of a saw; and where they wished to place several ranges, they took care that the teeth above were placed in a contrary direction to those below. The many absurd ornaments which force themselves upon our notice, in many of these edifices, are too numerous to be mentioned. Those which have the greatest pretensions to this ludicrous style of embellishment, are the portico of St. Giovanni e Paolo, on Monte Celio. These saws are accompanied by a kind of small modillion, with a species of ove underneath, which are doubtless intended to represent drops of rain. This rude description of ornaments is again found at the Annuntiata, contiguous to the Foro Transitorio, where the noble remains of the temple of Mars the Avenger, are seen. What a difference of taste in the same city and in the same edifice!

We may perceive other strange effects of the taste which ruled at this time, in the ruins of the edifice commonly named Palazzo di Pilato; which others believe to have been that of Niccolo di Rienzo; but which is, in fact, neither that of the one nor the other. Upon one of its faces is an inscription in verse which explains the whole. The poetry perfectly corresponds with the sublime architecture and pure taste of the eleventh century: it says that this marvellous palace was erected by Nicola, son of Crescenzo, first duke of Rome, and of Feodora. It presents a heap of the fragments of different species of sculptured

ornaments. The platbands, modillions, and consoles, are covered with them; the columns and their capitals, which are of brick, together with different members of the cornices, are all decorated with the saw-tooth ornaments. Besides these favourite embellishments, they imagined other pretty things, which passed at this time for the efforts of the most refined taste; such as the fringe which ornaments the exterior wall of the choir of St. Giovanni Laterano, and that of the church of Aracœli, near the Campidoglio. In one part there is a single, and in another a double range of small arches upon consoles, from which a species of tufts descends.

From this brief sketch it must appear evident, that from the fourth to the fifteenth century, the architecture of modern Rome, as well as that of other cities and countries, will bear no comparison with that of ancient Rome; nor indeed can they be said to have possessed any pretensions to architectural fame. In modern Rome necessity caused them to employ the columns of the antique edifices: but in what manner did they employ them? Beautiful as they were, they rendered them disagreeable; and even at Rome, in the midst of chef-d'œuvres, the rules of propriety and taste seemed no longer to exist. This destruction of taste extended to all the arts and sciences; painting, sculpture, poetry, and eloquence; all the operations of the human understanding suffered the same fate as architecture. The arts spring, improve, arrive at perfection, change, decline, are destroyed, and flourish again, from the same causes which produce the revolutions of cities, of nations, and of empires.

It will be very difficult at the present time,

follow, by any formal indication, the abridged history of the taste and disposition of the palaces and principal residences, situated in different countries, in this night of the arts, which is named the middle ages, without having recourse to ideas of the Gothic species, and to castles or fortified mansions, of which there scarcely remain either fragments or confused traditions. It is therefore necessary to pass over a great number of centuries in the history of architecture as connected with Italy, before we arrive at the epoch of erecting the ducal palace of Venice; the taste of which totally differs from that of the fortified seats constructed in England and France during the feudal governments. Italy was not governed at this time by the same system as the rest of Europe; feudality there was not so deeply rooted, and did not extend itself under the same forms. It was not seen covered with castles, the lords of which, being at war with their neighbours and sovereigns, inhabited bastions surrounded by moats and draw-bridges, instead of residences expressive of hospitality and civilization. It appears certain, however, that in Italy, the system of the antique architecture was never entirely extinct; at least some traces of it may be found in the edifices of all ages.

We now approach to the revival of architecture, and of all the other arts, of which the fifteenth century was the epoch. The cities that were desolated by the troubles which had agitated Europe, re-established it with emulation. The tranquillity which followed, permitted the undertaking of numerous constructions. The monuments of antiquity were remembered, and Brunelleschi appeared. Brunel-

leschi, one of the greatest men of whom modern architecture can boast, was the first who, with the scale and compasses in hand, surveyed the ruins of ancient Rome. After having exercised his talent in different arts, and formed his mind and taste by the study of ancient authors, he undertook to revive the maxims of antique architecture, and to draw them from the ruins in which time and barbarism appeared to have buried them for ever. He discovered and distinguished the orders; and was the first who, after having found their valuable laws, employed their just applications in his works.

The cupola of St. Maria del Fiori opened the way to the numerous similar structures that have since been erected; and this edifice, which gained the admiration of Michel Angelo, will always astonish those who know how to appreciate the merits of the inventors, and the difficulty attached to the first steps of every undertaking. This edifice, and several others with which Brunelleschi was entrusted, gained him great reputation as an architect. The students educated in his school spread themselves in the different parts of Italy, awakened a taste for architecture, and at the same time, propagating its true principles, raised a spirit of emulation for its encouragement, amongst the governing powers. Shortly afterwards the beneficent genii of the house of Medici, the dukes of Milan, and other princes and Italian nobles, opened their palaces and treasuries to cherish the arts, and seemed to be animated by a common desire to raise them from the oblivion into which they had sunk. The books of Vitruvius were communicated to the architects of Italy, who consulted them, and spread the

opinions of the author amongst the public; he being the only one of the ancients, whose writings upon architecture have descended to us.

Leon Battista Alberti, the second of the artists who constructed according to the principles of Vitruvius and the maxims of antiquity, contributed greatly at this time to the progress of architectural knowledge. He succeeded Brunelleschi, whose talents he emulated, and endeavoured to give to architecture more elegance and variety in ornaments, than his predecessor. His works on architecture evince great erudition, and perhaps tended more to correct the taste of his country, than that of Vitruvius himself; whose numberless obscurities cannot be explained even by experience and learned dissertation.

At this period the principal residences in France and England, were constructed after the system of military defence, at that time prevalent; which had no relation whatever to the Greco-Romano architecture, nor any resemblance to what is generally received as constituting a mansion. And from this time to the revival of the antique architecture, the habitations of kings, princes, and nobles, presented nothing but an assemblage of round and square towers; united by ranges of buildings forming spacious courts, and presenting to the eye, both inside and out, only masses of stone, pierced with apertures. Nevertheless, at the epoch in which these were constructed, Italy was covered with mansions, in the construction of which all the regularity of the antique forms and ordonnances, the masses, details, and proportions of the finest architecture were manifest. Already Majano, Rossellini, Pintelli, and Guiliano dá

Sangallo, had erected residences from which architects will continue to form their taste. In the palaces and private habitations erected at Rome in this the fifteenth century, the exteriors exhibit greatness, few divisions, and a well-preserved eurithmy. The windows are equally spaced: if in one story they are rectangular, and in great edifices traversed by a marble cross, in the next story they are terminated by a semicircle. Centred windows were at first without imposts, but afterwards they were added. Near to the old government house in the same city is a small house, which is probably of this century. The windows of each of its four stories are centred. What a degree of elegant simplicity is exhibited in this small construction!

Generally the architraves of the windows and doors have few members and little projection; the cornices being very simple, and without pediments.

The divisions of the stories were indicated by small projecting and acute cornices, which were afterwards tempered and changed to string courses.

In the interior of large mansions, they continued to construct loggias with insulated columns supporting arches, as is apparent in many of the monasteries, the palace Vicolo del Governo, and that of the duke Sforza Cesarini. Sometimes, instead of marble columns, they employed those of stone or brick, not cylindrical, but polygonal, as at the palace di Venezia, Piazza de SS. Apostoli, and the cloister Della Pace. There exists but one example of the employment of these species of columns by the ancients, which is at the Templum Rediculi.

It was at this time that the use of piers or pillars was introduced, decorated with engaged columns or pilasters, on pedestals, for the support of arches. They employed in the façades of the churches several orders; but without the former number of pediments, projections, and breaks. Their interior was no longer basilical, but divided into three parts by arcades, or in one alone with chapels; sunk more or less, in such a manner that the two last corresponding to the great altar, were gradually constructed so far in retreat, that the churches afterwards were designed according to the form called the Latin cross. There was afterwards another form employed, named the Greek cross. The greatest novelty that was introduced in the churches at Rome was the cupola, which had been at this time a thing of some date at Venice, and still greater at Constantinople.

Lastly, great and well-proportioned distributions, rectangular and monotonous forms, a sufficient solidity, a simple and dry decoration, without projections, breaks, or superfluity of ornaments, formed the character of the architecture of the fifteenth century, which may be regarded as the Aurora of the regeneration of taste.

We behold in the sixteenth, the boasted century, during which the fine arts flourished most in Italy, and particularly at Rome. In this century the arts approached nearer to that state of perfection which characterized them under Augustus, than they had previously or have since attained. Italy prided itself in having wrought this great change; and Tuscany claimed the merit of having, by means of the excellent artists which it had produced, spread good taste

through the greater part of Europe. Florence believed itself a second Athens, and thought that in the century during which the Medici presided over Tuscany and Rome, it had revived the flourishing periods of Pericles, Alexander, and Augustus. It is sufficient to cite the mansions Giraud, Doria, Buoncampagni, Della Cancellaria (*See* pl. 66, the details of which, like those of all the drawings presented in this work, are modified; and are not strictly according to the originals) and the Tempietto di Bramante, by Lazzari, generally named Bramante. His style was at first rather dry, and partook of that of the preceding century; but it afterwards became nobler, less broken, and hence more correct. The houses Caffarelli, Stalle d'Agostino Chigi, and chapel Chigi, by Raffaello. His works present the same purity of style that distinguished his predecessor, without having that meagreness with which he is reproached. The houses Massimi, Altemps, Papa Guilia, Farnesiana, and Salviati (*See* pl. 58, 59, and 63,) by Peruzzi, in whose productions there exist an exquisite choice of beautiful forms, the purest profiles, and a perfect accord in the parts. The whole presents solidity without heaviness, richness without luxury, and character without affectation. The houses Sacchetti, Farnese, Palma, church della Madonna di Loretto, chapel Paolina, and gate di St. Spirito (*See* pl. 60,) by Antonio Sangallo, whose works are generally esteemed for their simplicity of form, justness of proportion, sobriety of ornaments, purity of style, and their real and apparent solidity. A part of Farnese house, Campidoglio, and Sapienza college, by Michel Angelo, whose talents were sublime, but

without curb or measure; fertile in great ideas, but still more so in those which were capricious.

The villa Madama, Casino Lante, residences Ciccia Porci, Cenci, and the church della Madonna dell 'Orto, were erected by Giulio Romano, whose edifices are in general constructed and decorated with judgment. Lancelloti house, and Casino del Papa, by Pirro Ligorio. His works are models of good taste and elegance. The façade of St. Petronio, Isolani house, and Casa di Achille Bocchi, at Bologna; the Ducale palace, at Piacenza; the churches di Mazzano, di Sant 'Oreste, and della Madonna degli Angeli, at Assisi; the church di St. Francesco, at Perugia; Firenze house, at Florence; the villa Giulio, church of St. Andrea di Ponte Molle, Caprarola palace, gallery dipinta dai Carracci, with the doors and windows and interior arcades of Farnese palace, Doric door of the Cancelleria palace, Corinthian door at St. Lorenzo e Damaso, frontispiece at the Orti Farnese, gate del Popolo, and church del Gesu, at Rome, by Giacomo Barozzi da Vignola. His productions may serve as guides both for elegance and solidity. They are devoid of all fantasticalness and caprice, being the result of a fertile imagination and a sound judgment; which qualities distinguished Vignola as one of those who contributed most towards the regeneration of architecture. But that which will cause his name to live, when the hand of Time shall have destroyed his edifices, is his work on the orders of architecture. It was composed in the last years of his life, and completed under his immediate superintendance, at the time that his knowledge was matured by long experience. It will be seen, on consulting the preface to his work, that

Vignola studied rather the spirit manifested in the whole of the antique remains, than confined himself to a detailed imitation of any one in particular. In each of his orders, Vignola observed the antique examples which were generally reputed as the most beautiful. He remarked that they all owe their reputation to simple relations easily distinguished, which render the lesser parts dependant on the greater. " Wishing, for example, to establish the proportions of the Doric order, I have observed," says he, " that the Doric of the theatre of Marcellus was the most esteemed; I have therefore taken it for the principal rule of the essential parts of my Doric: but when I found that any lesser member departed from the division prescribed by the ordonnance in general (which often happens, either from the inaccuracy of execution, or other reasons), instead of renouncing the fundamental base, which I had adopted, I sought to establish the proportion of these lesser parts; not after any system of my own, but from other Doric monuments of antiquity equally esteemed, and in which these parts had not received the same alteration. I have always made choice of the antique orders; and on my part have only given the distribution of the proportions founded on simple relations, without employing measures in feet or palms of any country, but solely an arbitrary measure taken from the order itself, named module, and divided into a certain number of equal parts."

Vignola never departed from great proportions, such as halves, thirds, or fourths, the observance of which, in part, constitutes the principle of that beauty so much admired in his productions, and which has

raised his work on the orders of architecture, into universal repute.

The basilica di Vicenza, houses Tiene, Trissino, de Porti, and Valmarana, at Vicenza; Foscari house, monastery de' Canonici della Carita, refectory de' Monaci di St. Giorgio Maggiore, churches di St. Giorgio Maggiore, St. Francesco della Vigna, Il Redentore, Olimpico theatre, and many other edifices at Venice, were constructed by Palladio. It appears to have been his object, to shew that the principles of beauty and design exhibited in the antique edifices, are suitable to all periods and to all European countries, with the modifications that the ancients themselves have admitted in their works. From his manner of imitating them, he seems to have had no other system than that of making such a judicious application of their principles, as they themselves would have made had they exercised their art amongst the moderns. Thence the free, easy, and elegant application of the masses, lines, plans, and ornaments of the antique in all his constructions. The style of Palladio has been imitated in England by Inigo Jones, Wren, Gibbs, Chambers, and many others, who have modified his plans, façades, adjustment of his forms, profiles, ordonnances, and details.

The Pitti palace, at Florence; houses Ruspoli, Sacripanti, Negroni, and Romano college, at Rome, by Bartolomeo Ammanati. His works are admired for the judicious ordonnance of their details, beauty of their forms, disposition of the planes, apertures, profiles, and the harmony of the parts with the total.

The chapel del Presepio in St. Maria Maggiore, villa Negroni, Vaticana library, façade of St. Gio.

Laterano, palaces Vaticano, elevation facing the city, and Albani, at Rome, by Domenico Fontana. This artist cannot be considered amongst those masters of the art whose works are classic. In his edifices a great knowledge of construction is developed, and a taste which, without being absolutely pure, wanted neither simplicity nor greatness.

The college della Sapienza, churches del Gesu, St. Luigi de' Francesi, St. Maria in Via, Madonna de' Monti, St. Paolo alle tre Fontane, and de' Greci, at Rome, by Giacomo della Porta. The architecture of his churches presents a great number of projections, pediments above each other, and other similar extravagances. In his mansions the style of this architect is very unequal. Some are passable, such as the Sapienza, and the houses Gottofredi, Nicolini, and the Belvedere at the villa Aldobrandini; others again abound with the ordinary abuse that he made of pediments, projections, mezzaninas, &c. as the houses Marescotti and Serluppi. That of Chigi has a majestic vestibule, and a spacious and commodious court. There are many fountains designed by this architect, which are situated in the squares Navona, Colonna, Popolo, Rotonda, Campidoglio, and Madonna de Monti. The best are, that in the Piazza Mattei, and another in the Campidoglio, where the statue of Marforio is placed.

The houses Cornaro, Trissino, Molini, Pisani, Strozzi Ravaschieri, Fino in Bergomo, and many others at Vicenza, Venice, Florence, Padua, and Genoa, by Vincenzo Scammozzi. It is easy to perceive that his style is formed from that of Palladio, but it is reproduced by this learned author with great discernment and purity.

It was in this century, during which England, France, and Germany, were a prey to religious wars, that ten pontiffs, in succession, contributed to the erection of St. Peter's church, at Rome. (*See* the Frontispiece, and pl. 71 to 74; in which the defects exhibited in the details of the original, are omitted, and the whole modified.) This celebrated edifice was erected on the site of that which was built by Constantine, and which, from the plans that remain, appears to have been divided into five parts, by a hundred Corinthian columns; and presented two isles at each side of the nave. Its entrance consisted of a large square area formed by a colonnade. Pope Nicola V. finding it in a most dilapidated state, formed the idea of erecting another church, that should surpass the former in magnificence. He confided the important trust to Leon Battista Alberti and Bernardo Rosellini. The first-mentioned architect wishing to prepare for the execution of this great enterprise, first constructed a spacious apsis at the extremity of the site of the former; and for this purpose he demolished the temple of Probus, which was situated near it. The work, however, was not raised more than three cubits in height when Alberti died. In a short time afterwards Nicola V. died, without having enjoyed the satisfaction of seeing the designs of Alberti executed; and one of his successors, Giulio II., laid the first stone of this edifice. After having employed the most able architects in Italy to furnish designs for the intended church, the preference was given to those offered by Bramante; notwithstanding Michel Angelo Bonarroti, who had lately arrived in Rome, openly condemned them. To accelerate the construc-

tion of this new church, Bramante demolished the materials of the former church, together with the columns; the latter, Michel Angelo asserted might have been preserved and employed. Nevertheless Bramante raised the edifice in a short time to the entablature of the principal pillars.

Leone X. successor to Giulio II., gave all his attention to this new undertaking. He confided it to the care of Giuliano da Sangallo, Fra Giocondo Veronese, and the celebrated Raphaello, who had studied architecture under Bramante. Already this pontiff despaired of seeing the entire execution of the designs of Bramante, when Baldassare Peruzzi advised him to make several alterations in the project; this architect stating that the plan of Bramante was defective in its solidity. In his alterations, he preserved the great cupola, but gave the edifice a square form instead of a rectangular one, which was the form Bramante had assigned it. About this period, namely, 1521, Leone X. died.

Adriano VI. only survived him a year: the troubles with which the pontificate of Clemente VII. was disquieted, did not permit him to forward the execution of this edifice. Paolo III. testified his taste by the embellishments which the capital of his states received; and showed much zeal for the construction of the new church. After the death of Peruzzi, Antonio Sangallo made a new project and model, which were agreed to by Paolo III. In this plan, which was more extended than that of Peruzzi, he totally perverted the designs of Bramante. Sangallo dying in 1546, the pontiff was for some time undecided to whom it should be intrusted At length Paolo III. appointed Michel Angelo to be the architect of St. Peter's, with

full power to make such alterations in what was already built, as he might judge necessary; and to be guided solely by his own judgment in prosecuting the remainder of the design.

Michel Angelo altered the plan of this church to that of Peruzzi; namely, a cross, with its four extremities of an equal length, in the centre of which are placed four piers to support the cupola. He suppressed a great portion of the beauties exhibited in the designs of Bramante and Peruzzi, and augmented the dimensions of the different parts, without increasing the solidity in an equal ratio. He had not superintended the construction of this edifice more than three years, when Paolo III. expired. Giulio III. succeeding him, continued to Michel Angelo the trust. Shortly afterwards Giulo III. died; and the pontificate of Marcello II., who succeeded him, was of still shorter duration. Paolo IV. was elected to the pontificate, at which time Michel Angelo was studying the construction of the cupola. The model was finished, but its execution was retarded by the death of Paolo IV. This pontiff was succeeded by Pio IV., who continued the trust to Michel Angelo.

The church of St. Peter's was raised to the height of the spring of the cupola, when Michel Angelo died, in 1564; when he had superintended the erection of this edifice seventeen years. Some time before his death, he caused a detailed model to be made in wood, to which he affixed the drawings and specifications. After his death Pope Pio IV. appointed Pirro Ligorio, and Giacomo Barozzi, known by the name of Vignola, to succeed Michel Angelo; and he enjoined them to follow with exactness the project of

their predecessor. It was an opinion so generally entertained that no additional improvement could be made in the model of Michel Angelo, that at the expiration of two years, Pio V. dismissed Ligorio for having departed from it. Vignola alone remained, and occupied himself for the rest of his life in executing the exterior according to the designs of Michel Angelo. After the death of this architect, which took place in 1579, Gregorio XIII. deputed in his place, Giacomo della Porta, who had been the pupil of Vignola. This pontiff did not continue the construction of the cupola, but preferred terminating the decoration of the interior parts of the church. Sisto V. having succeeded Gregorio XIII., wished to have the reputation of erecting the celebrated cupola designed by Michel Angelo. Besides Giacomo della Porta, he engaged Domenico Fontana, whose talents had been proved on several occasions. They commenced to work at the attic of the great cupola, on the fifteenth of July, 1588. Sisto V. being anxious to finish this cupola, employed six hundred workmen, who relieved each other, so as to work night and day without intermission. The undertaking was forwarded with such ardour, that in a year and ten months, the attic and two cupolas were completed to the basement of the lantern. The pontiff gave solemn thanks over the last stone, which was laid the fourteenth of May, 1590; the cannon of the castle of St. Angelo announcing the circumstance. He caused the exterior of the cupola to be covered with lead, and decorated the seven projecting sides in face of the entrance with gilt bronze. Notwithstanding the celerity with which Sisto V. caused this work to be

erected, he had not the satisfaction of seeing it completed; for he died in the month of August, 1590; and the lantern, globe, and cross were not completed before November in the same year, under Urbano VII. The rest of the parts were executed by Giacomo della Porta, in the pontificate of Clemente VIII. Afterwards Paolo V. caused the church to be lengthened after the designs of Carlo Maderno; but he constructed the façade from those of Michel Angelo. All the different works were completed in 1614. Urbano VIII., Innocentio X., Alessandro VII., and several other pontiffs, enriched this temple with chapels, sepulchral monuments, and other embellishments; which were executed after the designs of the most celebrated artists of Italy.

The merits of this great work are exhibited in the plan previous to its alteration: in the employment of only one order, and in the tambour of the dome; which are beauties that compensate for a portion of the following defects presented in this edifice.

In the interior: the projection of the imposts exceeds that of the pilastres; the continuity of the principal entablature is interrupted by numerous breaks; and the ornaments with which the whole of the interior is decorated, are too abundant to be effective, and not in a correct style.

At the exterior: first, in its plan, by the distribution of its entrance, as also by the massives placed in the exterior of the circular parts of the three principal branches; secondly, in the elevations, by an erroneous application of pilastres, as also the numerous breaks in the entablature over them; by the ordonnance of its façade, which, although possessing the advantage

of presenting only one order, produces but little relief to the elevation, from the circumstance of its columns being engaged in the masonry; and the disproportion of the members of the entablature, which is said to have arisen from the extraordinary module of the columns. Lastly, the attic is too high; added to which, the employment of windows in the same, together with their defective form, and decoration; as also the decoration of the lantern of the dome.

The bad effects which result from Maderno adding three arcades in length to the western extremity of St. Peter's, which from a Greek became a Latin cross, are: first, that it no longer presents the spectator with a point of sight from whence any portion of the tambour of the great dome can be discovered; not even from the extremity of the immense area fronting the church; so that the most beautiful parts of this edifice remain concealed: secondly, the interior of the church is entered, under the expectation of enjoying the effect of the grand cupola, of which so much has been said, and which expectation is in a great measure disappointed. For the spectator, perceiving only a curved aperture in the vaulted ceiling, is obliged to advance a considerable distance before he obtains a perfect view of this rotundo, which ought to present itself from all points.

There have been a multitude of embellishments successively added to the interior of this temple, which, however, from the profuse gilding, the staccoes of the arches, and the walls being covered with different kinds of marble, have not merely destroyed the harmony, but have lessened, very materially, the general effect. Nevertheless the faults and errors

which are met with in so great an undertaking, ought not to excite astonishment, when it is considered that its construction was the work of three centuries, carried on under the direction of different individuals, several of whom made considerable innovations in the simplicity of the original design. A mixture of beauty and deformity, of greatness as well as littleness of design, might naturally be expected to result from the amalgamation of so many grades of genius and talent in the erection of one edifice. It cannot be denied, that no church has yet been erected, the area of which is equal in extent to that of St. Peter's; yet it by no means exhibits that apparent magnitude which a spectator, previous to entering it, expects to witness; and it is often matter of dispute whether it is equal in extent to the cathedral at Milan, or even St. Paul's at Rome. It is however sufficient to state, that the principal nave of St. Peter's is 610 feet in length, and the transverse 457 feet; and that the total length of the basilic of St. Paul at Rome is scarcely 267 feet. Nevertheless, St. Paul's appears to be of greater extent than St. Peter's. Place two ranges of insulated columns in the interior of the latter, as is the case with the former, and you will immediately discover St. Peter's to be the most spacious church in the world. The employment of insulated columns in an edifice increases its apparent extent; they fill up the vacancy of an extensive area, and form a lengthened perspective, by furnishing the eye with objects on which it can rest, and from which the mind is enabled to form an estimate of the extent of space which they occupy, which is apparently increased by their number.

This demerit of St. Peter's is derived from modern

architecture, which, having proscribed the forms of the ancient basilicæ and lines of insulated columns, employed only pillars and massives; which producing but little effect, present heavy and monotonous structures.

At the commencement of this century, celebrated for the prosperity of the arts and hence the cultivation of a correct taste, architecture exhibited a very promising display of genius and talent at Rome. Bramante and Sangallo treated architectural decoration with the reserve which a study of the antique remains, as yet little known, inspired. Peruzzi, Raphaello, and Vignola, advanced with more liberty, and greater intelligence: thus the proportions of the orders were more correctly delineated; the beauty of insulated columns was discovered; the use of arches placed upon the capitals of columns was condemned; a great variety of forms for churches and palaces was introduced, and their distribution enlarged; presenting at this period real and important advantages to architecture.

These benefits and this progress were increased by the translation of the work of Vitruvius, and the commentaries made by Alberti, Serlio, Vignola, Palladio, Scamozzi, and many other professors of architecture. Every thing appeared favourable for the establishment of a correct architectural taste, and the opportunity seemed at hand to give permanency to whatever was excellent in the art; when Michel Angelo appeared, who, with the capricious sublimity of his genius, overthrew all and introduced the most fantastic forms. He prescribed to and governed Fontana, Porta, Ammanati, and a multitude of others; corrupted the taste of this century, and influenced that

of the following by the evil of his example. The abuses which he introduced, or that he and his partizans raised into credit, are, niched and coupled columns, together with others supporting little or nothing. A repetition of the same order in several stories. Those of different heights and species in the same story; a single order which embraces several stories, others without character, or again mingled with different characters. An injudicious application of pedestals and pilasters of various kinds, and some even reversed, being larger at the upper extremity than the lower. An absence of proportion; capricious profiles; and a superfluity of mouldings; together with a profusion of insignificant ornaments. Pediments of different descriptions employed without discrimination, both in the interior and exterior. The application of entablatures to irregular plans, as also offering a continued series of breaks. And lastly, churches with façades, presenting two stories, and interiorly encumbered with heavy pillars instead of columns, which form one of the greatest beauties of architecture.

The architecture of the seventeenth and eighteenth centuries adopted many of these imperfections; so that a detailed description of their edifices would be tedious. A chronological list of those which are most deserving of notice will suffice. The chapel Paolina in St. Maria Maggiore, Basilic di St. Sebastiano fuori le mura, and Sciarra Colonna palace, by Flaminio Ponzio. In the last-mentioned production, the fine division of the different stories, the judicious and noble proportioned distances of the apertures, a reasonable employment and distribution of ornaments, at once simple and majestic, are generally admired.

At this period the system of the antique architecture was introduced into England by Inigo Jones. It had been introduced into France during the preceding century by Serlio, Primaticcio, and Pierre Lescot, in the construction of the Louvre and other edifices. In the year 1620, Inigo Jones was charged with the repairing of St. Paul's cathedral, at London. This old Gothic church was falling into decay in many places. Our architect erected a portico of the Corinthian order at each side of the Gothic frontispiece that he repaired. We find amongst his works the plan and elevation of one of these porticoes (that of the western side), which construction disappeared with that of the ancient cathedral, at the time of its re-construction by Sir Christopher Wren. We are obliged to acknowledge the justice of the critique that has been passed on the style employed in these additions. Nothing is so unbecoming in the restorations which are obliged to be made in Gothic edifices, as this medley of different styles, and above all of antique ordonnances, the system of which is totally different, and can produce no other effect than that of a contradiction, which offends the sight as much as the understanding. Inigo Jones was afterwards charged with the construction of the great enterprise of the royal palace at Whitehall, the designs for which he had commenced and finished in the reign of James I.

It is from this production that we are best enabled to judge of the genius of our architect. It may be affirmed, that a greater or more magnificent ensemble of a palace was never conceived and projected by any modern architect; and if the disasters of the period had not interrupted its execution, London might have

boasted of possessing the most magnificent palace in Europe. Unhappily, it is but in his designs that we can form an idea of its merits. The combination of variety and regularity, of greatness and simplicity, exhibited in the plan of this immense edifice, which was intended to form a perfect quadrangle, are truly admirable. The space occupied by this plan is divided into three equal parts. That in the centre is a spacious court, which traverses the whole of the palace: the other two are each composed of three courts, environed by buildings, the masses of which correspond in their general appearance. The elevation of this total offers the most perfect symmetry in its four exterior façades, each of which is formed of masses of buildings, of which the dispositions and ordonnances are balanced by a general, uniform, and always greatly varied motive, either by the advance or retreat of the parts, or by the diversity of the elevations. Each façade is similar to the other exteriorly. The interior of the palace presents in its different elevations, details which seem to present all the variety that good taste could unite.

To gain a more precise idea of this design, it will be necessary to examine the works of Inigo Jones, published by Kent in 1770, where the beautiful details of this great enterprise are engraved. It is in these designs that we may discover how much Inigo Jones appropriated the style of Palladio. Every part of this immense composition brings to mind, in the employment of the orders, porticoes, bossages, basements, profiles, details, form of the windows, doors, &c. that rich and simple, noble and elegant style, that Palladio and the architects in Italy of the sixteenth century,

applied in the palaces of the great, and also in the dwellings of private individuals.

We may be convinced by that beautiful fragment of Whitehall palace, named the banqueting-house, with what ability Inigo Jones appropriated the beauties of the great masters from whom he copied.

It is composed of a very high rustic basement, on which rise two stories, each of which has seven windows. The height of each story is occupied by an ordonnance of columns and pilasters; the lower are Ionic, and those above Composite. The whole is surmounted by an attic and balustrade. Some of the details in this ensemble give rise to criticism. It would be better if the cornice was not in projection over the engaged columns and pilasters. It is also to be wished that Inigo Jones had not followed the bad practice of a swelled or curved frize in the entablature of his Ionic order. Notwithstanding these little irregularities, the aspect of this edifice is rich, and exhibits a nobleness of character. The windows have elegant architraves; the execution is pure and choice; and a person of adequate judgment acknowledges at once the style of a Palladio.

The church of St. Paul, Covent Garden, is mentioned as being constructed from the designs of Inigo Jones. This edifice presents a portico of columns, of what is called the Tuscan order; which is of great simplicity. It cannot be denied that this mass bears a sufficiently serious character, yet neither the interior nor exterior is distinguished by any merit either of composition or execution.

The Royal Exchange, at London, built after the great fire in this city, is also said by some to have

been erected from the designs of this artist; though others attribute both the design and execution to Sir Christopher Wren; but if it be the design of Inigo Jones, it is considered at the same time as not being one of his best productions. This edifice has an arcade in the centre of its façade, accompanied by a smaller one on each side, the latter extending round the front and lateral elevation forming a piazza, the whole of which is decorated with the Corinthian order. It is from the middle of this part of the Exchange that a lofty tower is raised, ornamented with the Ionic, Corinthian, and Composite orders. The superior part of the structure is terminated by a balustrade and ornamented with statues.

The large arcade in the centre of the two elevations, serves as entrances to a noble area, in which the merchants assemble; and is surrounded by a piazza, that serves as a convenient shelter from the sun and rain. A staircase in the north and another in the south front, communicates with a gallery on the second story, which runs round the whole building, and leads to various offices occupied by underwriters and merchants.

One of the greatest and most remarkable edifices in England is Greenwich Hospital, situated on the south bank of the Thames, at the distance of five miles from London bridge. It was designed by Inigo Jones, and completed from his projects by Webb, his pupil. This immense total of buildings, which at the present day serves as an hospital for invalid seamen, was originally destined for another purpose. Inigo Jones had projected it for a palace for Charles I. It appears that he had but completed a part of this vast construction, when its continuation was interrupted by political

circumstances. It remained in this state until William III. resolved to grant the land and buildings intended for a royal palace, for the establishment of an hospital for invalid seamen; and accordingly the part executed by Inigo Jones was accompanied with the corresponding parts and buildings which constitute the whole of the present plan. It cannot be affirmed that all the parts of this edifice are executed according to the original designs of our architect, since the change of its destination would necessarily require particular disposition. The present ensemble is composed of two spacious square masses of buildings, situated on an extensive terrace, on the south bank of the Thames. Each of these buildings, which are perfectly symmetrical, has a court in its centre. Their anterior and posterior façades are formed of a basement, upon which the Corinthian order is placed, that occupies the height of the two stories; an attic, surmounted with a balustrade, crowns this ordonnance. Two parts in advance, with four engaged columns supporting a pediment, are disposed in the façade at each side of the entrance, flanked with coupled pilasters, corresponding with others at the angles, which are also coupled. These pilasters accord with four others in return, which terminate the ordonnance and delineate the dimensions of the façade. The two anterior and posterior elevations just mentioned, are united at each side by a mass of building less elevated, by the height of the attic, and perforated in each of the two stories with windows cut in the bossages, which give to these wings a very masculine character. The centre is occupied by four columns in advance, similar to those of the façade. As the whole of this

ensemble is composed of two parts perfectly symmetrical, the description of one, as above, will serve to convey a just idea of the other.

The grand area or esplanade which separates the two above-mentioned buildings, discovers two domes of considerable elevation, which rise over insulated porticoes. These domes terminate a long range of buildings at each side, evidently of a style posterior to Inigo Jones. The whole ends in an avenue, which leads by a slight ascent to the royal observatory.

From a view of all the parts of which this great edifice is composed, it becomes evident that it is the work of different times and successive artists. The style of Inigo Jones is only found in that part of the edifice of which a more special description has been given, and in which the style of Palladio is evident, particularly in the bossaged wings before-mentioned. Criticism would find something still further to observe respecting the façades, both as to the disposition of the columns and pilasters, and the distribution of the masses and parts in advance, which leave the principal entrance with a secondary decoration. The weight of the attic also, which appears too heavy for the ordonnance, is objectionable. But this composition has, nevertheless, great beauties; it presents a noble and masculine character, greatness in its masses, and that symmetrical and complete total in its lesser parts, which it is rare to find in extensive structures.

M. Milizia, in speaking of this edifice, blames it as regards its character, which, according to him, ought to have been simple, and without luxury, conformable to its uses. The critique is just; but it is necessary to observe that this fault cannot be attributed to Inigo

Jones, who could not foresee this change in its employment.

We find, in some Itineraries, frequent mention of extensive country seats, erected in the different counties of England by Inigo Jones; but these notices are not of sufficient authority. The collection of his works, published by Kent, contains indeed a great number of plans and elevations for public and private buildings, but the publisher has omitted to state whether these designs are those of buildings executed, or merely projects found in the portfolio of the artist. All that can be said of these designs is, that if they have not been executed it is to be regretted, as there is not one the erection of which would not have been creditable. They all exhibit the taste, style, purity, and elegance of Palladio, and the best architects of the sixteenth century. This collection may be usefully consulted by those who wish to apply to architecture the forms, ordonnances, and particular character which distinguish the works of the Greeks and Romans. It may indeed be said of the character of the ancient architecture, that it was imitated with more success in the course of the sixteenth century, than at any period from the time of its restoration to the present.

The churches St. Carlo de Catenari, St. Gregorio, and St. Caterina da Siena, at Rome, were erected from the designs of Battista Soria, whose works exhibit sumptuosity and irregularity. The churches della Pace, St. Maria in via lata, St. Martina, or St. Luca, and Sacchetti ad Ostia palace, at Rome, are by Pietro Berrettini da Cortona. His works present great abuse of decoration, and all that viciousness of style that an indolent mind, corrupt and irregular in its taste, cannot

fail to introduce. The frontispiece of the church des Feuillans, rue St. Honoré, the palaces de Berny and de Baleroy, in Normandy; de Blezancourt, a part of that of Choisy-sur-Seine, de Petit-Bourg, de Blois, part of the interiors of the palaces de Richelieu and de Coulomniers, the exterior of the palace and gardens de Gesvres en Brie, the principal part of that of Fresne, together with a chapel which was, in some respects, the model of the church du Val-de-Grâce, at Paris. The palace de Maisons, hôtel de la Vrilliere, and de Jars, the church des Filles-Sainte-Marie, in the rue St. Antoine, part of the hôtel de Bouillion, the frontispiece des Minimes de la Place Royale, to the second order exclusively, termination of the hôtel Carnavalet, and its façade, the church du Val-de-Grâce, and the projects for the competition of the Louvre, at Paris, are all by François Mansart. He has produced no work which, from its merit, is capable of fixing the attention of posterity; and the history of good taste in architecture is as little indebted to him as to many other modern architects.

The façade of the church di St. Ignazio, and the villa Pamfili, at Rome, are by Alessandro Algardi. Algardi, in the decoration of this seat or casino, has avoided the faults of the architects of his time, which consisted in covering the façades of palaces with bass reliefs and antique statues, confusedly placed, which injured the ordonnance and symmetry. This disposition in the works of Algardi is the result of a correct and judicious taste. The interior presents details of decoration which might serve as models for their species. Algardi also passes for the designer of the superb gardens of this country seat, which are disposed

in the most picturesque and varied manner, according to the inequality of the situation. They abound with fountains, cascades, and amphitheatres of water, which embellish and render them the most delightful at Rome.

The churches di St. Agnese, decoration of St. Gio. Laterano, the oratorio de' PP. della Chiesa Nuova, di St. Carlino alle quattro Fontane, di Propaganda, della Sapienza, and della Madonna de' Sette Dolori, the palaces Falconieri a Strada Guilia and Panfili or Doria, at Rome, are by Francesco Borromini. He reduced architecture to a species of mechanical operation, and obeyed no law in the forms which he had adopted, but that of his own caprice. His fantastical elevations present a mass of vicious forms, which were never employed previous to his time, the only merit of which consists in the possibility of executing them. The fertility of his invention ceases to astonish us, when we reflect that it is much more easy to form designs for an edifice, unshackled by the rules of art and correct taste, than to produce such as will bear the test of an enlightened criticism, and exhibit judgment, ability, and propriety of disposition. His style of decoration resembles that of a gold or silversmith, which is capricious, and without any immediate relation to necessity or propriety. It obeys no other authority than that of an indetermined and puerile pleasure. The only principle which Borromini either practised or possessed, was that of contradicting all who had preceded him.

The palaces Barberini, di Monte Citorio, and di Bracciano, churches del Noviziato de' Gesuiti, nell' Ariccia, and Gandolfo, and the fountains di Piazza Navona, and in Piazza Barberini, at Rome, were from

the designs of Gio. Lorenzo Bernini, who also executed in St. Peter's at Rome, the tombs, chair of St. Peter, and the high altar. It may be remarked, that in the disposition of the chair of St. Peter, he has been very successful in the judicious choice of its situation. A window is situated behind the four colossal statues of the doctors that support it, the light of which produces considerable effect. Of the high altar, or rather that senseless production of four twisted columns, which sustain a canopy, as if placed expressly to encumber and obstruct the grand intersection of the four branches of the temple, it may be further observed, that it is difficult to conceive how such an absurdity could have originated with that same Bernini who constructed the colonnade of the Piazza di St. Pietro. The Piazza di St. Pietro, or place of St. Peter, is of an elliptical form, surrounded by four ranges of insulated columns, which bear an entablature crowned by a balustrade and statues. There is an obelisk at its centre, on either side of which is an immense fountain, which emits, with great force and sound, a considerable body of water. The immense area, terminated by the façade of the church, the spacious steps of which form two spaces resembling terraces, presents one of those rare productions and fortunate conceptions which impart the greatest delight to the spectator; yet how much more enchanting would it be, were it not for the bad taste exhibited in the façade of the church, and the mass of the pontifical palace which overload one of its sides. Notwithstanding the faults and licences which this place offers, in spite of the bellied columns, and Ionic cornice with the Doric order, it is one of the finest productions of modern architecture. The archi-

tects, up to this time, had never employed so many columns to such advantage. The façades of the entrances at the extremities, and in the middle of the colonnade, are agreeable, and the lateral arches, with architraves, very judicious. The pilasters in the two porticoes of communication between this colonnade and the frontispiece of the church, do not appear to advantage in their inclined situation, and accord badly with the decoration of the façade.

The royal staircase erected by Bernini, in the best possible manner that the situation would permit, namely, in the middle of old constructions, is very remarkable; the light is arranged with great art, the steps easy and little raised, and the ensemble majestic. What a view in descending! The insulated columns, in perspective, upon the first ramp, and the coupled pilasters upon the second, show the talent by which the artist has overcome the difficulty with which he had to contend, in a given and limited site. The part that he has taken is admirable, but not imitable. The style of Bernini, in architecture, presents more licenses than absolute errors, and his graces prevent us from dwelling too long on his faults.

The peristyle du Louvre, and observatory, at Paris, are by Claude Perrault. This artist, in the façade of the Louvre, has presented to our notice coupled columns, which may serve as a useful example to show their inconsistency. They add nothing to the strength, under which pretext they have been employed, since, if equally divided, they would have afforded much greater solidity, independent of their increase of beauty, by having a considerable less portion of the soffit to support. The peristyle du Louvre, indeed, as origi-

nally designed by Perrault, that is, before the windows were made under the colonnade, seems to have been erected to exhibit the pompous magnificence of a court, and not for the purposes for which similar erections are employed. Yet notwithstanding the greatness of the style which is expressed, the proportions of the windows of its basement, and also the application of the pilasters which are employed at the angles of its pavilions or extremities, are not in correct taste. In the rest of its details, however, we are indebted to Perrault for having revived with great ability the justness and beauty of the antique proportions ; a purity in the profiles, elegance in the forms and ornaments, and a correctness and finish in the execution.

The palaces Renuccini, Altieri, Astalli, and Muti, and the chapel del Monte della Pieta, at Rome, were erected from the designs of Gio. Antonio de' Rossi, whose style in architecture was great, and of large division. None showed more ability in lighting the interiors. His taste in decoration was correct. He particularly possessed the art of accommodating his designs to, and of drawing an advantage from, the different situations of his productions, and of giving an appearance of greatness even to the least spaces.

The bridge de Saintes, the gate of St. Denis, and the restoration of those of St. Bernard and St. Antoine, at Paris, are by François Blondel. The celebrated gate St. Denis exhibits an architectural character between that of gates and arches ; custom has however sanctioned the name of gate. It was according to this character that it was composed and that it ought to be examined. Its just denomination will then be a triumphal gate. Some details of its archi-

tecture, as also the fine execution of the sculpture, are composed after the antique style, whilst the adjustments are according to the style in vogue at the time of its erection, which consisted in observing certain systems that have for a long time impeded the progress of architecture. François Blondell, being a learned mathematician, in designing the masses and general dimensions for this gate, professes in his treatise on architecture to have subjected them to, and determined them by, a rigorous calculation, although in the execution the measures do not altogether correspond. He has inscribed the general mass in a perfect square, and intended that the width of the aperture of the gate should be equal to that of the piers. The height of this gate is twice its width, the pedestals are a fourth of the height of the mass, and the impost of the arch is one half of its height. He conceived that he had demonstrated, by the exactness of his relations, that the eye ought to be satisfied; because the science of numbers did not permit of the least doubt, in his estimation, as to the beauty of the forms so determined. When, therefore, an enlightened traveller, whose taste has been formed from the noble character of the antique architecture, presents himself before this monument, and criticises the mass as having a little meagreness, he may be immediately answered, *It forms a perfect square.* If he finds the width of the aperture of the gate too contracted, and not bearing sufficient proportion to the planes, he is as quickly informed, *It is equal to the piers.* But its aperture is proportionally too high. *It is of twice its width, and this is an admirable dimension.* The massive wants thickness, and does not convey a sufficient idea of resistance. *This*

thickness is exactly the sixth of its face, &c. &c. The observer is obliged to agree that the calculations are just, but not entirely satisfactory; in which example he proves for himself that beauty in architecture cannot be founded solely on the relation of numbers. Is it not, on the contrary, evident, that this equality of measures destroys the government which the essential parts ought to have over the proportion of the rest, and gives a monotony which is injurious to the effect of this great composition? Indeed a mind exempt from the prejudice of false systems, and conversant with the impressions which bodies, happily modified, make upon the eye from the effect of perspective, and the combination of light and shade, would, in judging of a piece of architecture, feel itself authorized to say that numbers do not suffice to determine the proportions of architectural designs. As to the decoration of this triumphal entrance, although great and majestic, it presents dissimilar and compound ideas. Such are the pyramids, which ornament the faces of this monument, whose mixed forms partake of that of an obelisk, and the principal fault of which is in being applied to a triumphal entrance. This form being dedicated to tombs and funeral objects, imparts a sepulchral expression to this monument, which is evidently in contradiction with its real character.

The palaces Royal de Clagny and de Versailles, the establishment de Saint Cyr, church des Invalides, and the place de Louis-le-Grand, or Vendôme, at Paris, were constructed from the designs of Jules-Hardouin Mansart. The palace de Versailles presents only an architectural total in the elevation fronting the gardens. The façade in face of the avenue, which

forms the principal entrance, conveys rather the idea of a number of different edifices than of a palace. The masses are so dissimilar, both as regards the style and proportion, that the attempt which has been made to form a regular total of the whole has been without effect. If we examine the façade facing the garden, its disproportion strikes us at the first glance; it proceeds from the want of relation which exists between its length, which is about thirteen hundred feet, and its height, which does not exceed sixty feet. Every one must feel the insipidity of this long line, in the disposition of which there is neither relief nor movement. The columns, forming small parts in advance, which are disposed at intervals, produce no effect; the basement, ordonnance of the principal story, and continued attic, possess no other merit than that of a contracted conception of regularity and symmetry, which displays a very ordinary taste, and is not at all suited to give value to the composition of this great edifice.

The master-piece of Jules-Hardouin Mansart is the dome of the Invalides, at Paris. It appears certain that the project of a cupola did not at first enter into the views of the projector of this edifice, nor in the designs of the architect of the church and hospital des Invalides. The manner in which the church was conceived and executed by Liberal Bruant is the proof; and when it was designed to embellish the total of the establishment des Invalides with a cupola, this cupola could not be placed elsewhere than at the extremity of the church, which produced in reality a union of two churches, without any relation existing between them.

Jules-Hardouin Mansart being more at liberty, in

the conception of his cupola, than the other architects of similar edifices, since this cupola only became an addition of the then existing church, was led to design it as a separate construction, with dispositions solely in relation with itself. So that in considering the plan, we find, by the distribution of the chapels which surround this dome, that it presents a total which is different from any that has ever been erected in a similar situation.

The dome des Invalides being carried perpendicularly from the pavement, and the great solidity which the architect found in the accessory massives with which he could dispense, gave him the means of practising a new manner of distribution in the four piers of his cupola. He penetrated them with arcades, without injuring the strength of his supports, and these apertures not only served as entrances to the chapels situated at each angle, but also gave a lightness which on the whole produces a more varied and picturesque effect than is often met with elsewhere. It cannot be denied that in this respect Jules-Hardouin Mansart has given proofs of considerable talent.

The extravagances and inaccuracies with which Michel Angelo infected the architecture of the sixteenth century, were increased in the seventeenth by the caprices of Borromini, of which the following enumeration forms a part. Twisted, bellied, and intricated columns, placed without motive upon heaps of pedestals, socles, and plinths; fantastical capitals with the volutes reversed; interrupted and undulated entablatures; misplaced, broken, and deformed pediments; inverted balusters, with facets, multiplied even to the summits of pediments; the façades of

churches in caricature, and their interiors heavy and without expression, together with a superfluity of ornaments.

The simplicity of Ponzio, Algardi, and Jones, and the elegance of Bernini, ought to have had some influence in the architecture of the eighteenth century. How far that elegance and simplicity were imitated will be seen as we pursue our researches.

The churches di St. Marta, and the façades della Beata Rita and di St. Marcello al Corso, palazzi Grimani a Strada Rosella, and Bolognetti, and the fountain di St. Maria in Trastevere, and another near the gate Cavallegieri, at Rome, are by Carlo Fontana. The taste of this architect is the same as that of Bernini his master. Like him he was incorrect; he neglected like him the purity of his details, and was led to sacrifice essential forms to the spirit of decoration. But his elevations wanted neither greatness in the masses nor a certain elegance in execution.

It was at this period that the erection of St. Paul's cathedral was completed by Sir Christopher Wren. It is situated on the site of a former church, that is said to have been built on the ruins of an ancient temple of Diana; and had been embellished, at considerable expense, about the year 675, by Erkinvald, the fourth bishop of London. This church was second in extent only to the then existing basilic of St. Peter's, at Rome, and was afterwards destroyed by fire. Maurice, of this city, undertook to construct a second, worthy, from its magnificence, of the worship to which it was intended to be consecrated; and he caused it to be erected on the same foundations. The carpentry and belfry of this church also were consumed in the

middle of the sixteenth century. After this accident, and during the time it was undergoing the necessary repairs, the whole was burnt by the great fire at London. It is related that this second church contained many valuable ornaments; and that the festivals and obsequies of the kings and princes were solemnized in it with great pomp and magnificence. After the entire ruin of this edifice, Christopher Wren was employed to give designs for a third church, to be subjected to the former foundations. For the space of two years Sir Christopher repeatedly advised those who were interested in the erection of this new edifice, to demolish the old foundations, at the end of which time he obtained their consent, and immediately after designed and constructed a church more worthy of his talents, and of the nation for which it was intended.

The plan of this edifice is a species of cross composed of four branches. That at the principal entrance, and the one at the opposite extremity, are much longer than the other two. Each of these is divided by two ranges of arcades into a great nave, and two lateral ones, the pillars of which are decorated with Corinthian pilasters. It has three porticoes, one at the principal entrance, facing the west, and the other two are situated opposite the north and south at each extremity of the cross. The western portico consists of twelve Corinthian columns below, and eight Composite above, supporting a pediment; the whole resting on an elevated base, the ascent to which is by a flight of steps running the entire length of the portico. At each of the two extremities of this façade is placed a small cupola, after the example of those of St. Peter. The porticoes of the northern and southern entrances

are semicircular, and consist of an entablature supported by six Corinthian columns. At the eastern extremity of the church is an apside, or semicircular part, within which the communion table is placed. The walls are ornamented with two ranges of coupled pilasters, one above the other, the lower being Corinthian, and the other Composite. It is at the intersection of the four branches of which the plan of the edifice is composed, that the dome or cupola is situated. Its plan at the lower extremity forms a regular octagon; each of its faces is occupied by large arcades, forming the communication of the naves. Four of these arcades, which are those situated opposite the angles of the cross, are constructed as immense niches; the lower part of each is penetrated by two smaller arcades, forming a right angle. These arcades correspond to the lateral naves of the two contiguous branches. This ingenious disposition procures very interesting overtures, the idea of which was probably derived from the plan of the cupola di Maria del Fiore, at Florence: be that as it may, this arrangement is much better than that of placing a massive in each angle, which has been adopted in almost all modern cupolas. There is a further advantage of forming a more solid base, and of the pendentives having less projections, by being composed of eight points of support instead of four.

The interior of the lower part of the cupola is decorated with a continued stylobate, upon which are placed Corinthian pilasters at equal distances, and surmounted by a complete entablature; over which is placed a second stylobate, from which springs the cupola. The thirty-two equal spaces between the pilasters are occupied by twenty-four windows and

eight large niches. In the exterior decoration of this part of the dome, Wren wished to apply the effect of a regularly disposed colonnade of equal intercolumniations, and supporting a continued entablature, instead of being interrupted by projections resembling those of St. Peter's at Rome, and the Invalides at Paris. In saying that he wished to produce an effect similar to a colonnade, the expression is justifiable, for it is rather the appearance of one, than one in reality. First, the columns, which are placed on a continued stylobate, perfectly similar to that of St. Peter's, are engaged in piers from which arches are sprung that bind them to the dome, and massives are placed between every fourth intercolumniation, in the angles of which they are engaged. In the interiors of these massives are winding staircases, being in the whole eight in number. This disposition, particularly at a distance, gives a very rich effect to the dome, which appears to be surrounded by a circular colonnade. The passages in the massives permit of free circulation round the whole of the dome. The regularity of the intercolumniations, and continuance of the entablature, give a value to this decoration, which on a nearer inspection, is perhaps slightly injured by some irregularities. Be that as it may, it cannot be denied that the whole produces a fine effect. The attic is in retreat the whole width of the colonnade, which latter is ornamented with windows of rather a correct taste. The calotte, or exterior of the dome, has its sides decorated with flutings. The lantern presents nothing very remarkable. The curve of the dome is very fine, and nearly equals that of St. Peter's.

Of late years, there have been placed in the interior

of this church a number of statues and sepulchral monuments, which partake of the same false taste of invention as those in Westminster abbey, among which it is difficult to discover any considerable number that are consistent with the correct taste, and appropriate sentiment, which these species of monuments ought to present. In this country these kind of productions are in want of a principle of imitation, to form a regulating type. Religion does not at all enter into the first conceptions; and the more a taste for these monuments has increased, within the last half century, the more the artists have felt this want of a fundamental idea to serve as a base for their compositions. These monuments, whatever be the merit for their execution, are almost always dramatic compositions, in which we see contrasted, in a manner the most revolting to good taste, unsuitable costumes, misplaced allegories, and a style of composition altogether at variance with an enlightened judgment.

Independent of the monuments just mentioned, the decorative part of St. Paul's is the least striking part of this celebrated edifice. This cathedral derogates in the most evident manner from that purity of style which ought to enter into the composition of such edifices. At the exterior, the frontispiece is decorated with two orders raised one above the other, the columns of which are coupled in a line parallel to the horizon. In the interior, the piers of the naves and choir are enriched with pilastres of large and small dimensions. The entablature is complete only perpendicularly over the large pilasters. The arcades which repose upon the lesser pilasters, enter into the height of the architrave and frieze of the entablature.

The supports of the dome, decorated also with pilasters, are perforated by a first range of arcades, which is placed directly upon the cornice of the large pilasters, and penetrates its acroteria. A second range of arcades, the curves of which are of different species from those of the first, rises upon the same acroteria.

These are striking dissonances in the style of this cathedral, otherwise so justly celebrated for its great extent and the judicious execution and beauty of its cupola, which furnish lessons by the study of which may be formed just ideas of the digressions from purity of style.

The fountain of Trevi, at Rome, the greatest that this city presents, was constructed from the designs of Nicola Salvi. The subject of this fine composition is the ocean personified, gigantic in stature, and in an upright and commanding position, proceeding from a fine niche decorated with Ionic columns. Neptune borne on a shell, and drawn by sea-horses, which are guided by Tritons, appears to be forcing his way over a mass of rocks, from all parts of which issue streams of water. In the midst of tumultuous currents, the horses appear at full speed, with their Triton guides, labouring through the troubled element, which falls with considerable effect into an immense basin beneath. This beautiful production is situated immediately contiguous to the palace of the Duke di Poli, which forms its extremity, and is decorated on each side of the Ionic niche with Corinthian columns, which embrace two stories, and contain in their intercolumniations statues and bass reliefs. Upon the two sides, but in retreat, are four Corinthian pilasters, which also embrace two ranges of windows. Upon their

entablature is an attic, which is lower than that part in advance. This description may suffice to make known its beauties.

The hospital Il gran Reclusorio, and cemetery of the hospital Il Tredici, at Naples; the palaces Giordani and Caramanica, near Spadaletto; and the villa Jaci, at Resina, near Portici; the churches Maria Maggiore, del Bambin Gesu, Maria dell' Appollinare, and della Morte, hospital St. Spirito, and the palaces della Consulta, Petroni, and Corsini, at Rome, were erected from the designs of Ferdinando Fuga, whose works partake, in their decoration and details, of the vices and abuses of the school of Borromini. The interior distribution, and exterior disposition of the last-mentioned palace is, however, admired; and it may be remarked, that few palaces have been better conceived, or executed more at large, than this. Its three overtures, great staircases, and the proportions of its façade, all exhibit greatness of design. More correctness and purity in the details and style would have increased the merit in the eyes of artists and men of taste.

At the commencement of the eighteenth century flourished Lord Burlington, who was not only distinguished for his correct taste and general knowledge of the fine arts, but also celebrated for his skill in architecture, which he had cultivated with great success. He travelled for a considerable time in Italy; during his residence in which country he studied with particular attention the immortal remains of this classic soil, as also the works of Palladio, sixty of whose original designs he collected and published, together with a volume of the Antique Thermæ. To

the above designs of Palladio, Lord Burlington also added several of his own compositions, at the lower part of which he modestly inscribed "Burlington, architectus invenit." This great man, who was a most zealous patron of the arts, was prouder of that title, which he derived from his favourite art, and which he had deservedly acquired by a long and diligent study, than of that which he possessed from his noble ancestors. In 1724 he furnished designs for the stately mansion of General Wade. The ground story is decorated with rustics, which gives to it a very imposing effect; and the story above is ornamented with well-distributed Doric pilasters, supporting a simple frieze. The windows with balustrades possess great simplicity. The whole of this total presents a degree of solidity, correctness, and unity, that affords considerable pleasure to the spectator. His beautiful villa at Chiswick, which was erected from his own designs, and which he embellished with a number of fragments of architecture, is an ensemble, capable, by the happy motives which are manifest in its distribution, of doing honour to most of the architects of the century. He furnished designs for the arcade and front of the dormitory at Westminster and Burlington House, London; together with several other classical productions, which will be lasting memorials of the talents of this celebrated, zealous, and enlightened patron of the arts.

The most important production of its kind in this century was the palace of the king of Naples, at Caserte, by Van Vitelli; being the only enterprise of this century which for the simplicity of its plan, immensity of its superficies, and greatness of its mass

and elevation, brings to mind the eminent productions of the fifteenth and sixteenth centuries. The principal work at the close of the eighteenth century was the completion of St. Genevieve's church at Paris, commenced from the designs of Soufflot. The plan of this church is in the form of a Greek cross, composed of four principal naves. A hundred and thirty fluted columns support its arches, under which are galleries. The cupola is placed in the centre of the edifice, and is sustained by four triangular pillars, the angles of which are fortified by engaged columns ranging with those of the naves. The interior faces of these pillars are decorated with pilasters of the same order and diameter of the columns, which are Corinthian. These four pillars form, at the exterior of the angles, a large square, the interior angles of which are interrupted by a third face. The four principal sides are opened by large arcades, between which, and over the interior faces of the pillars, rise the four parts of the arch termed pendentives, which serve to form the circular plan of the tower of the dome. These arcades and pendentives are crowned by a large entablature with modillions. The interior of this tower is decorated with a continued stylobate, which serves as basement for a colonnade composed of sixteen Corinthian columns placed at equal distances. These columns are almost insulated, being only attached to the wall of the tower by a kind of tongue, which does not appear from any point of view, and which serves to strengthen the wall to which they are joined. Behind this stylobate, and between the bases of the columns, are a species of galleries. In the intercolumniations above are sixteen large windows, four of

which are feint, and correspond with the four pillars previously mentioned. The colonnade is crowned by a complete entablature, over which is a large socle, which rises to the height of the spring of the interior cupola. The arch is decorated with octangular compartments and roses, and is terminated at the summit by a large circular aperture. Through the opening of this first cupola the extremity of an intermediate arch may be perceived, upon which a subject in painting is executed.

The exterior of this church presents at its principal entrance a peristyle composed of twenty-two Corinthian columns, which support an entablature and pediment ornamented with bass reliefs. Behind this peristyle, and from the centre of the edifice, a circular gallery rises, which is placed upon a stylobate of the same form, and is composed of thirty-two insulated Corinthian columns. The four massives which serve as buttresses, and in the middle of which are staircases, are situated directly under the gallery. Although this colonnade is in a manner divided by these massives into four equal parts, nevertheless there remains sufficient space between them and the columns to admit of free circulation under the gallery; where no column is either strengthened or engaged, and the appearance of a colonnade effectively exists in all its reality, both near and at a distance. In retreat from this colonnade rises an attic with circular-headed windows, immediately above which rests the cupola, surmounted by a lantern.

The church of St. Genevieve loses greatly as regards style, both in the massives of its plan, and in the proportions of the order employed. First, at the

exterior, the peristyle of the frontispiece is vicious in its plan. The columns which accompany its extremities are in retreat. A species of pilaster is also placed at all the projecting angles of the church, and the angles which join its four branches are interrupted. Such are the faults committed in the masses against purity of style. Afterwards the essential parts of the orders, interior and exterior, are altered in their principal members. Lastly, the arches, penetrated by a multitude of lunettes, and covered with ornaments of an improper kind, destroy the purity of style which ought to exist in so important an edifice.

Rome, if we except some of the buildings and edifices erected in Great Britain and France during the present century, possesses more numerous examples of architecture capable of supporting the severity of criticism, than can be found elsewhere. The examples which it presents are formed of parts so great and beautiful, that no other country can vie with them in quality or number. Such of its edifices as may be censured with the greatest reason have still some merits; and often fewer faults than those which are considered masterpieces in other countries. They offer a judicious conception, happy and picturesque dispositions, beauty in the total and details, and an almost never-ending variety. It is true that all the epochs of its history have not been equally remarkable, nor distinguished by a similar purity of taste; but genius has always presided in the conceptions produced in this beautiful country.

Italy presents a multiplicity of delightful habitations, which, under the most simple forms, bear the marks of genius, and show that it is possible to exhibit talent

even in the least productions. This observation ought to console those who profess an art in which only a very rare concurrence of fortunate circumstances, can afford them an opportunity of displaying their talents in the erection of any important edifice.

If Bramante, Vignola, Palladio, Sangallo, and Peruzzi, have found models in antiquity for the edifices that they have erected; if these great masters have been enabled to employ, even in the least dwellings, that beauty of ordonnance, happy disposition, and research, which constitute the charm they possess; why has not their example been more generally followed?

No one can behold, without the most lively interest, the works of the able men just mentioned, who in the construction of a simple habitation, manifested the same talent, care, and research, that they displayed in the erection of churches and sumptuous edifices. They have embellished all; and in their hands the modest retreat became as agreeable as the magnificent palace. They were sensible of the importance of their art, and from their works may be learned how to redeem it from the prejudices of routine and extravagances of caprice. They adopted nature for their guide, and its imitators for their models; they have, in a manner, restored architecture, by reclaiming it to its real end. We behold them everywhere profit from the difference of site, and fill with an admirable skill the wants which the object requires. They were ingenious even in the most minute details, and never executed at hazard. They perceived that nothing can be beautiful in architecture, unless commanded by an acknowledged utility: that true genius is manifested, not as some moderns have believed, by making war upon reason to create

novelty and produce fantastical extravagances, but in happily employing in the art the means that the nature of the intended uses of a structure indicates, and that the site commands. It was by fulfilling these conditions that they were enabled to give to each object its proper character; and being always thus guided by a correct taste, they have succeeded in overcoming the difficulties which they had to encounter. The greater part of their productions bears the stamp of that rare simplicity that enchants the mind like an unveiled truth, which appears always easy to those to whom it is disclosed.

It appears to have been their endeavour to produce the greatest effect by the simplest means; whilst the artists of other nations appear often to have sought its production in the contrary extreme. These erroneous ideas were by no means favourable to economy; for it is evident that such architectural productions are more expensive, as the buildings and edifices designed by the above-mentioned architects, owe their splendour rather to the arrangements of their plans and aspect of their mass, than to any vain profusion of ornaments.

It is no proof that the fine arts have made their abode in a city, because a number of sumptuous buildings may be found therein. Powerful individuals might for a time have favoured the art from pride or caprice; but when at each step we are arrested by a masterpiece of magnificence or simplicity; when, above all, we meet with structures erected for public utility; when the most minute details bear the marks of that delicate taste which announces that an entire people has cultivated the fine arts; then it is that we know we are in Italy, in which beautiful region the arts

were for a long time domesticated. It is there alone that the most modest habitation offers to the observing artist beauties which are less imposing from their extent, than by the correct distribution which they present; satisfying all that necessity requires. It is that refined taste, so long possessed by this ingenious people, that ought to be emulated. Our century, although enlightened by so great a degree of scientific knowledge in construction, has not made a proportionate progress in architectural design. Indeed, until there are places instituted, either public or private, where the student can receive instructions in its general principles, and also compete with others, the whole to abide the decision and remarks of qualified individuals, the rising architects cannot be expected to possess any great degree of talent in architectural design. The instruction to be gained in an architect's office, is inadequate to produce a talented artist. A knowledge of the different branches in construction, and the general routine of an office, are certainly essential; but to be able to conduct the execution of buildings, without possessing the ability requisite to produce judicious and skilful designs, allowing each of these to be unquestionably necessary qualifications, the former is certainly of minor importance, during the limited period allotted for a professional education, inasmuch as it is remediable by a little experience; while the latter quality rarely can be acquired, except when enjoying peculiar advantages for its study.

The spirit of improvement manifested in London, Edinburgh, Glasgow, and the principal towns of Great Britain, during the last sixteen years, has

offered such frequent opportunities for the display of architectural talent, that a mere enumeration of the principal edifices erected during that period, could not be given in the present work.

THE ANTIQUE ORDERS.

Having reviewed the productions of the most celebrated artists, as fully as the nature of the present work will permit, and endeavoured, whilst doing justice to the merits of their works, to draw a useful lesson from their errors as well as from their beauties, we shall now proceed to the consideration of each of the constituent parts of architecture, and to the development of those rules by which their employment is regulated.

An architectural order, and the particular expression of character attached to it, should not be considered as exclusively confined to a certain kind of columns, but is exhibited in all the parts of an edifice; nevertheless, the column is the regulator. For this reason, the name of order is given to supports which differ from each other both in proportion, form, and decoration; and are distinguished by the terms Doric, Ionic, and Corinthian. Each of these, from the nature of the proportions attached to it, and the characteristic effect which these proportions produce, serves to express a principal quality, with which the relation of its parts, its form, and ornaments correspond. Yet it is not to be concluded that the particular expression of the quality belonging to

each of the three styles, is not susceptible of a great variety of modifications.

Thus, the Doric order, which is characteristic of strength, may be made to express many degrees and shades of this quality, by the variations practicable in its proportions and profiles. The antique remains of this order are a sufficient proof of what is here advanced.

The Ionic presents the medium quality, being that of elegance. Whilst the Corinthian order, exhibiting delicacy and richness, possesses every requisite to produce the various degrees expressive of the particular quality belonging to it, in the modified employment of its proportions, forms, and ornaments.

It does not follow from what has been advanced, that the information and methods given by Vitruvius, Vignola, and Palladio, should be rejected; but that the orders allow of a great variety of expression, without injury to the uniformity of the character of each; and that architecture cannot, either in its total or details, be subjected to geometrical relations.

It is perhaps unnecessary to observe, that the supposed Composite order has the same proportion as the Corinthian, being only a mixed composition of this order and the Ionic; that the Tuscan is nothing more than a simplification of the Doric; and that, in reality, there are but three orders in architecture, namely, the Doric, Ionic, and Corinthian. Nevertheless, the proportions and different expressions of these five orders, in conformity to the usual method, will be treated of, commencing with the Tuscan, and ending with the Composite, without regarding the different dates of their origin.

OF THE FIVE ORDERS IN GENERAL.

PLATE I.

A general idea of the five orders will be obtained from this plate, in which they are all reduced to the same height, thereby rendering their comparative proportions more apparent, and exhibiting at one view the difference of diameter and general expression.

The Tuscan order is distinguished by the simplicity of its members, and its massive proportion; the height of the column being but seven times its diameter, or fourteen modules, which is its extreme height. The Tuscan order may be employed in prisons, barracks, hospitals, entrance gates, magazines, markets, &c.

The column of the Doric order has for its extreme height eight diameters, or sixteen modules; and is distinguished by the triglyphs which are distributed in the frieze of its entablature, and by a less equivocal expression of originality than the preceding order. It might often be judiciously employed in the different kinds of sacred, public, or private edifices; such as churches, tribunals, and banks; or in commercial edifices, as halls or exchanges, and in all other erections that require a character either of solemnity or of stability and security.

In the Ionic order the column has nine diameters, or eighteen modules, in height, and is characterized by the volutes of its capital, and by its proportions being lighter than those of the Doric. It may be suitably employed in the exterior of edifices requiring

an expression of elegance, and in the interior of apartments, and may also sometimes be placed as the second order in the exterior elevation of buildings.

The Corinthian order is still lighter than the Ionic, its column having ten diameters, or twenty modules, in height. It is characterized by the delicacy of its forms and proportions, and the richness of its ornaments. The Corinthian order may be employed in the decoration of palaces, in the interior of churches, &c. and generally in all situations where delicacy and magnificence ought to be preferred to strength, solemnity, simplicity, or elegance.

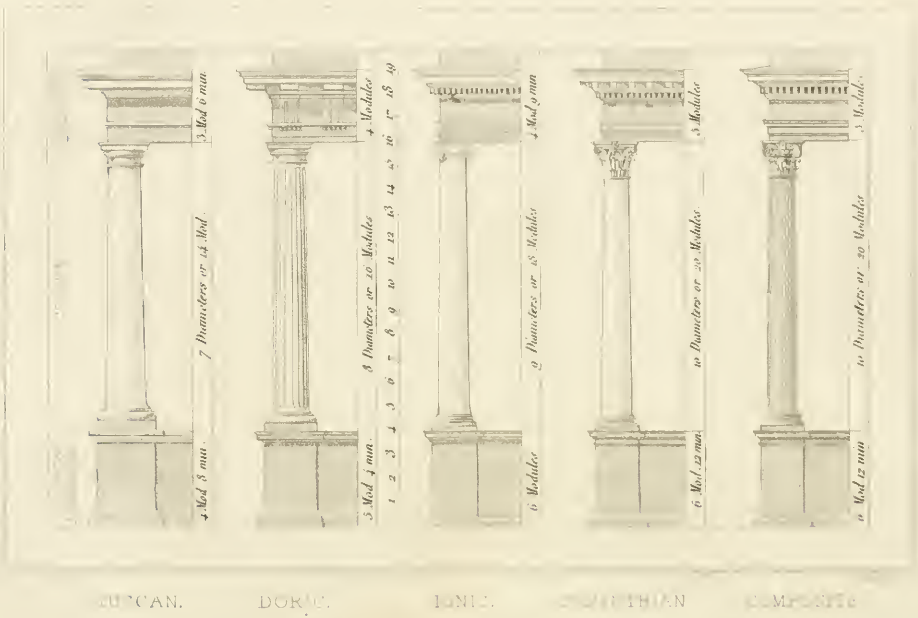
Lastly, the Composite order, being of the same proportions as the Corinthian, distinguishes itself by the ornaments of the medium and delicate orders, of which its capital is composed. This order might be appropriately used in the decoration of triumphal arches, theatres, public *fêtes*, and on all occasions where symbolical ornaments ought to have the preference over those essentially consecrated to the other orders.

THE GENERAL DIVISIONS OF THE FIVE ORDERS OF ARCHITECTURE.

PLATE I.

An order of architecture is generally composed of three principal parts; namely, of the column, which assigns to all the rest of the ordonnance its proportions; the pedestal; and the entablature.

THE FIVE ORDERS OF VIGNOLA.



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In each of these three parts are comprehended three others, namely, the pedestal, which is comprised of a base, die, and cornice; the column, the parts of which are the base, shaft, and capital; and the entablature, consisting of the architrave, frieze, and cornice.

These different parts are composed of several others, to which is generally given the name of mouldings. By this word is understood all the lesser parts of architecture, which constitute the art of profiling, whether the application be made to the orders, or to the ordonnance employed in the decoration of buildings. Mouldings, in general, take their expression of solidity, elegance, or delicacy, from the different orders to which they belong. They are reduced to seven different kinds, the names of which, together with their respective dimensions, centres, and manners of tracing, will be found in the tables and plates of the details belonging to each of the orders. *See* also pl. 2.

THE EXTREME PROPORTIONS OF THE FIVE ORDERS OF ARCHITECTURE.

PLATE I.

According to Vignola, the height of the pedestal ought to be one-third of that of the column, and the entablature one-fourth. To find this relation, it will be most expedient to divide the total height of the ordonnance into nineteen equal parts, appropriating

four for the height of the pedestal, twelve for that of the column, and reserving the three remaining parts for that of the entablature. Three being the fourth of twelve, and four the third of this number, and these three quantities, four, twelve, and three, being equal to nineteen, form a division which serves as a general rule; not only to determine the heights of the Tuscan pedestal, column, and entablature, but also the relations of those of all the other orders. To determine the expression of the Tuscan, Doric, Ionic, Corinthian, and Composite column, the height of the Tuscan must be divided into seven parts, the Doric, into eight, the Ionic into nine, and the Corinthian and Composite into ten. These divisions being made under a given height, which is common to the whole, as in plate 1, the different diameters which each order ought to possess will be immediately found; the proportions of which will be—the Tuscan one-seventh, the Doric one-eighth, the Ionic one-ninth, and the Corinthian and Composite one-tenth of the height of the column. That being determined, each of these diameters will be divided into two equal divisions, and one of these divisions will form a module, destined to measure the principal parts and details of the order. This module is again divided into twelve parts or minutes for the Tuscan and Doric orders, and into eighteen for the Ionic, Corinthian and Composite orders, in order to avoid fractions. The system most generally adopted for the diminution of columns, is that which commences from a third of their height.

A COMPARATIVE TABLE

OF THE

GENERAL PROPORTIONS ASSIGNED TO THE TUSCAN ORDER,

BY THE MOST EMINENT MODERN MASTERS.

		PALLADIO.						SCAMOZZI.						SERLIO.						VIGNOLA.					
		Height of the Members.			Projection from the axis of the Columns.			Height of the Members.			Projection from the axis of the Columns.			Height of the Members.			Projection from the axis of the Columns.			Height of the Members.			Projection from the axis of the Columns		
		Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions	Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions.
Entablature	Cornice	1	13	½	2	6	..	1	11	..	2	4	½	1	..	..	1	22	½	1	10	..	2	9	..
	Frieze	..	26	..	....	22	½	1	9	..	....	22	½	1	..	..	....	22	½	1	5	..	....	24	..
	Architrave	1	5	..	....	27	½	1	2	½	....	26	..	1	..	..	....	22	½	1	..	..	....	24	..
		3	14	½	-	-	-	3	22	½	-	-	-	3	-	-	-	-	-	3	15	-	-	-	
Column	Capital	1	..	..	1	..	..	1	..	..	1	1	½	1	..	..	1	..	..	1	..	..	1	6	½
	Shaft	12	..	..	.. 1	22 ..	½ ..	13	..	..	.. 1	22 ..	½ ..	10	..	..	.. 1	22 ..	½ ..	12	..	..	.. 1	24 ..	.. ..
	Base	1	..	..	1	10	..	1	..	..	1	9	..	1	..	..	1	12	..	1	..	..	1	11	¼
		14	-	-	-	-	-	15	-	-	-	-	-	12	-	-	-	-	-	14	-	-	-	-	-
Height of the Column and Entablature		17	14	½	....	..	..	18	22	½	....	..	..	15	..	..	....	..	..	17	15	..	....	..	..
Pedestal	Cornice	..	..	..	....	..	..	..	22	½	1	14	..	..	..	..	....	..	..	..	15	..	1	21	¼
	Die	2	..	..	1	13	..	2	..	..	1	9	..	..	..	..	....	..	..	3	8	..	1	11	¼
	Base	..	..	..	....	..	..	1	..	..	1	12	..	..	..	..	....	..	..	..	15	..	1	21	¼
		2	-	-	-	-	-	3	22	½	-	-	-	-	-	-	-	-	-	4	8	-	-	-	-
		Height of Members.			From face of Arcades.			Height of Members.			From face of Arcades			Height of Members.			From face of Arcades.			Height of Members.			From face of Arcades.		
Impost		1	4	½	....	16	..	..	27	½	....	9	½	..	..	..	....	..	..	1	..	..	....	7	..
Archivolt		..	26	..	....	3	..	..	25	½	....	4	..	..	..	..	....	..	..	..	25	..	....	3	..
Key of Arcades without Pedestals		..	..	..	....	..	..	1	4	..	....	..	..	..	..	..	....	..	..	..	..	..	....	..	..
Key of Arcades with Pedestals		..	..	..	....	..	..	1	16	..	....	..	..	..	..	..	....	..	..	..	..	..	....	..	..
		Height.			Width.			Height.			Width.			Height.			Width.			Height			Width.		
Intercolumniations from axis to axis		..	..	..	10	..	..	..	..	..	6 8	20 ..	.. ..	..	..	..	10	..	..	..	..	..	6	20	..
Columns of Arcades without Pedestals, from axis to axis		..	..	..	....	..	..	..	..	..	12	..	..	..	..	..	....	..	..	..	..	..	9	15	..
Apertures of Arcades without Pedestals		..	..	..	....	..	..	14	26	..	7	20	..	..	..	..	....	..	..	13	..	..	6	15	..
Columns of Arcades with Pedestals, from axis to axis		..	..	..	12	25	..	..	..	..	13	10	..	..	..	..	....	..	..	..	..	..	12	22	½
Apertures of Arcades with Pedestals		15	10	..	9	13	..	17	6	½	8	20	..	..	..	..	....	..	..	8	22	½	17	15	..

There being no existing remains of the Tuscan order amongst the antiquities, it is only possible to present in this Table the opinion of the most celebrated modern masters; who, with the exception of Vignola, have divided the module into thirty parts or minutes. To form a correct comparison, therefore it is necessary that his also be subjected to the same divisions—except in the detailed Tables and Plates, where the method of Vignola has been strictly adhered to, namely, of dividing the modules of the Tuscan and Doric orders into twelve parts, and those of the Ionic, Corinthian, and Composite into eighteen. The projections for all the orders are taken from the axis of the Columns to the farthest projecting point of each Member.

The Arcades of Scamozzi, with Columns without Pedestals, have a socle under their base one module in height, and one module twelve parts in projection taken from the axis of the Column.

THE TUSCAN ORDER.

The clearest and most incontestable proofs which remain for us of the style of the Etruscan architecture is, without doubt, that ordonnance of the Tuscan temple, employed at the time of Vitruvius; who has given the measures and details, not as if this style were out of use, but in language similar to that which he employed in describing the other temples existing at his time. This ordonnance of the Tuscan temple, the only monument that we have of the Etruscan architecture, as preserved at Rome, has been the source of great error in the modern systems of the orders.

To this may be attributed the appearance of a pretended Tuscan order, which has been placed as the first in the scale of the orders. From a similar error, a supposed Composite order, which has never had existence as a distinct order, has been raised to the highest place in the scale.

The Tuscan ordonnance, as given by the moderns, is not, however, purely of their invention; but, as will be shown, the error has been committed by taking that for a separate order which is, and always was, the order called Doric; but practised in Etruria with some variety of proportion and slight modifications, independent of the imitation of the carpentry, or constructions of wood, which constitutes the special and original character of the Grecian architecture.

In order to be convinced of this identity of origin between the Tuscan ordonnance and that of the Greeks, it is necessary to consult the specimen of

the Tuscan temple designed from the description given by Vitruvius, a drawing of which may be found in Piranesi's work on the magnificence of the Romans. The reader shall, however, be presented with a faithful translation of the text of the Roman architect, on the ordonnance of the Tuscan temple.

Vitruvius, b. 4, c. 7. "The diameter of these columns, taken at the bottom, should be the seventh part of their height. Their height should be a third of the breadth of the temple. Their diminution at the top should be a fourth of the diameter at the bottom. Their base should be half a diameter in height; it is composed of a circular socle or plinth, having the half of the base in height, and of a torus which, with its fillet, should be of the height of the plinth.

"Upon the columns should be placed coupled beams, the thickness of which should be proportionate to the size of the edifice, and the breadth equal to that of the collarin of the column. These beams should be joined together by a dovetail, so as to leave between them a space of two fingers breadth; for if they are placed so near that the air cannot pass between, they will produce heat, which causes the wood to rot. Upon these beams, and upon the masonry which is placed thereon, should project the mutules, having a projection equal to a fourth of the diameter of the column. To their ends may be applied the usual ornaments, over which should be placed the tympanum, with the pediment, either of masonry or carpentry. Upon the pediment should be disposed the pans and boards, in such a manner that the stillicidium or eaves may correspond in projection

to the tertiarium (that is to say, to the eighth part of the total of the tectum.)"

Nothing is easier, as may be seen, than to restore the Tuscan ordonnance, after such a detailed description; and such a restoration can have nothing arbitrary, since not only the whole, but each of the parts of which it is composed, have been described by Vitruvius, who has taken great care to give us the measures and relations of their proportions, which the moderns have certainly departed from. Indeed, the designs which all the translators and commentators of this writer have placed to his text, most satisfactorily demonstrate, that the modern Tuscan sensibly differs from the ordonnance of the Tuscan temple as described by Vitruvius.

A faithful drawing of this ordonnance, such as would necessarily result from the description and proportions given by Vitruvius, would exhibit all the parts and details of the Grecian architecture.

TUSCAN ORDER OF VIGNOLA.

PLATES 3 AND 4.

Names and detailed Proportion of the Members and Mouldings of which the Order is composed.

		Heights.			Projections from axis of Columns.		
		Modules.	Parts or Minutes.	Fractions.	Modules.	Parts or Minutes.	Fractions.
	Drain	-	2	-	2	3	½
	A. CORNICE.						
	Quarter round	....	4	....	2	3	½
	Astragal	....	1	....	2	....	....
	Fillet	....	....	½	1	11	½
	Conge	....	1	....	1	10	½
	Corona	....	5	....	1	10	½
	*Canal	....	1	....	1	9	½
	*Flute	....	....	½	1	7	½
	Fillet	....	....	½	1	2	....
Entablature 3 mod. 6 parts.	Cyma Talon	....	4	....	1	1	½
		1	4	-			
	B. FRIEZE.						
	Frieze	1	2	-	....	9	½
	C. ARCHITRAVE.						
	Tenia	....	2	....	....	11	½
	Conge	....	2	....	....	9	½
	Fascia	....	8	....	....	9	½
		1	-	-			
	D. CAPITAL.						
	Fillet	....	1	....	1	2	½
	Conge	....	1	....	1	1	½
	Abacus	....	2	....	1	1	½
	Quarter Round	....	3	....	1	1	½
	Fillet	....	1	....	....	10	½
	Conge	....	1	....	....	9	½
	Collarin	....	3	....	....	9	½
		1	-	-			
	SHAFT.						
Column 14 modules.	Astragal	....	1	....	....	11	....
	Fillet	....	....	½	....	10	½
	Conge	....	1	....	....	9	½
	Shaft from Conge to Conge	11	8	....	.. 1	9	½ ....
	Conge	....	1	½	1	....	....
		12	-	-			
	E. BASE.						
	Fillet	....	1	....	1	1	½
	Torus	....	5	....	1	4	½
	Plinth	....	6	....	1	4	½
		1	-	-			
	F. CORNICE.						
	Fillet	....	2	....	1	8	½
	Cyma Talon	....	4	....	1	8	....
		-	6	·			
	DIE.						
Pedestal 4 mod. 8 parts	Die	3	6	....	1	4	½
	Conge	....	2	....	1	4	½
		3	8	-			
	G. BASE.						
	Fillet	....	1	....	1	6	½
	Plinth	....	5	....	1	8	½
		-	6	-			
	Total	22	2	-			

---

* The dimensions of the canal and flute should not be included in that of the cornice, as the height of the canal is taken from the corona, and that of the flute in the height of the fillet.

☞ The module of the Tuscan order is divided into twelve parts.

MANNER OF DRAWING THE ORDERS.

After having constructed the scale of the modules, in such a manner that the total height of the order may be contained in the given height or surface to be employed, draw a line of base for the pedestal. In the middle of this line raise a perpendicular, which will form the axis of the column. Having proceeded thus far, draw the heights of the different parts, as given in the tables, parallel to the base, observing that it is more correct to take the dimensions of the different heights from the base, than to add them successively to each other.

Thus, 4 modules and 8 parts (of the Tuscan order for example) should be taken with the compasses, and placed on the perpendicular from the line of base, to obtain the top line of the pedestal; 5 modules and 8 parts for the upper part of the fillet of the base of the column; 17 modules and 8 parts for the top part of the astragal of the column; 18 modules and 8 parts for the top line of the capital; and lastly, 22 modules and 2 parts for the top line of the cornice of the entablature.

These principal divisions being once determined, it will be easy to find the sub-divisions of each part, with the aid of the table. That done, the projections only remain to be determined. These are contained in the same tables in which the dimensions are given from the axis of the column; whilst in the plates 4, 6, 8,

10, 14, and 18, of the details, they are given from the face of the entablature.

The profiles which result, ought always to be made on both sides at the same time: for the same opening of the compasses being employed in all the parts which are of the same projection, greater correctness will be the result, than when they are taken at different times. Plate 2 gives the drawings of the different mouldings, which enter into the composition of the members of the different orders.

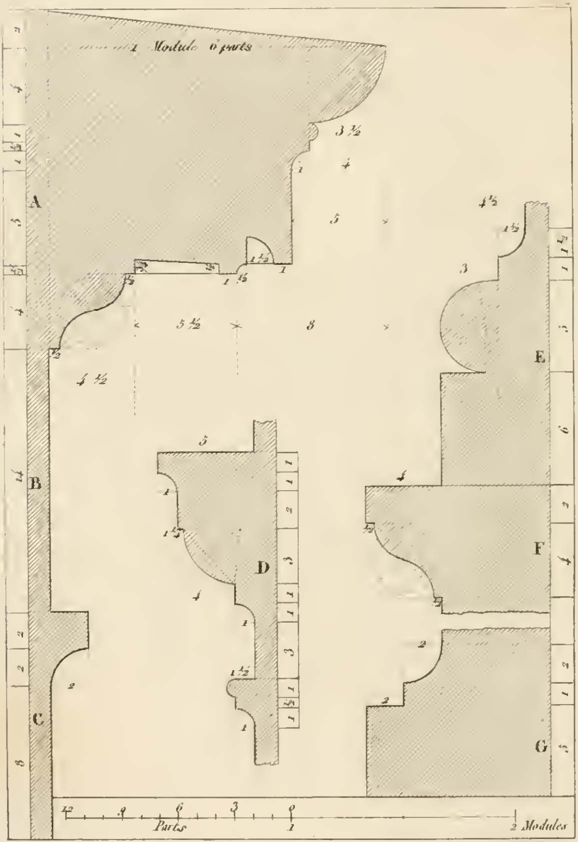
To describe the torus, fig. 1, divide the line *mn* into two equal parts, which point will form a centre from whence to strike the semicircle; observing that its projection should not be greater than that of the face of the plinth. The height of the quarter round, fig. 2, and the projection of the fillet below being determined, raise a perpendicular from its face until it intersects the line above at *p*, which is the centre.

The projection of the lower extremity, and height of the cavetto, fig. 3, being given, draw a line from the two points till they meet at *p*, which gives the point of centre from which to strike the moulding. Having determined the two points, *b*, of the cyma talon, fig. 4, divide it into two equal parts at *a*, which line will serve as base for two equilateral triangles, the summits of which, as at *c*, will be the centres for the segments, *d*.

The cyma reversa, fig. 5, is generally employed below the eye, as in the base of pedestals; and is traced after the same method as fig. 4, which also applies to the cyma recta, fig. 6.

The fillet, fig. 7, is a square member, consisting of right angles.

DETAILS OF THE TUSCAN ORDER.



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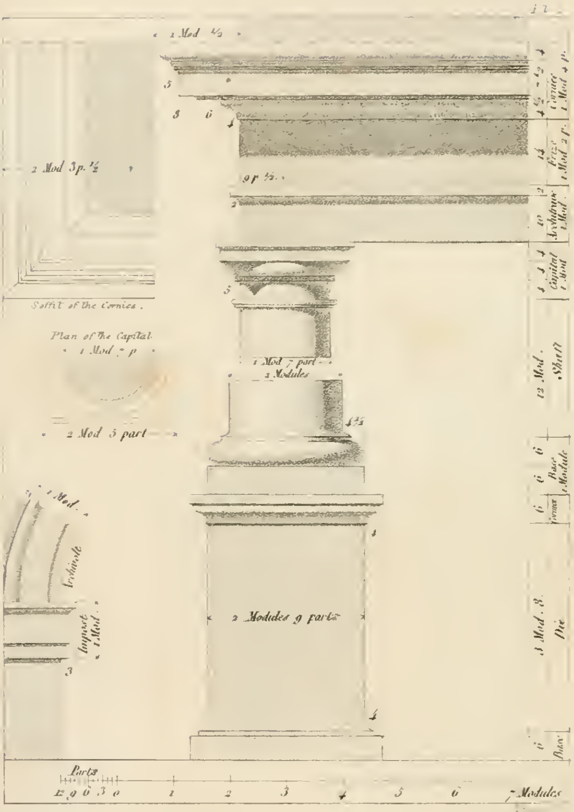
TUSCAN ORDER.



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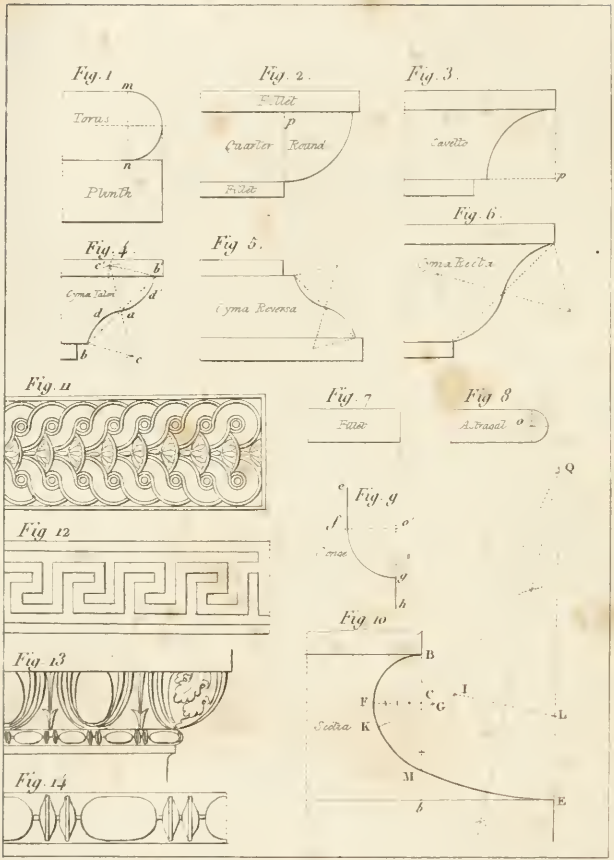
MOULDINGS



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The astragal, fig. 8, is traced by the same method as fig. 1, except that the face of the part below should have the same projection as the vertical line passing through the centre *o*.

The conge, fig. 9, of the shaft of the column *e*, and fillet *h*, is drawn from the point of intersection *o*, of the two lines *f* and *g*, making *of* equal to *og*

To trace the scotia, fig. 10, draw a vertical line from the face *B* to *b*, which must be divided into three equal parts; then from the point *C* with the radius *CB*, describe the arc *BF;* afterwards divide the line *FG* into five parts, four from *F* to *C*, and one from *C* to *G;* from *G* draw the arc *FK*, and from *F* describe a segment, having for its radius two parts, which will determine the line that passes through the points *K* and *G*. From the fillet *E* raise the perpendicular *EQ;* after which, from *G* strike another arc, having for its radius two parts, which will fix the extremity of the line *IK;* from *I* describe the arc *KM*, and through the points *MI* draw the line *MQ*, making *EL* equal to *MI;* and from the points *I* and *L*, raise a vertical line to determine the intersection at *Q*, which will form the centre; whence to describe the rest of the curve *ME*.

OF THE ARRANGEMENT OF MOULDINGS.

The judicious execution of profiles depends on several rules, which may be reduced to two principal ones. The first governs the proportion that the projection of the profile ought to have in relation to its height;

the second determines the greater or less number of mouldings, which the nature of the ordonnance to which they are adapted, requires. By the first of these rules, the base of a column of any order ought not to exceed in height the half of its diameter, and its projection should be about one-sixth. The same principles require that the cornice of the Doric order be two-thirds of its projection in height; whilst the Ionic and Corinthian cornices, ought to present a projection equal to their height. The second rule, admits in a base of the Doric order, but three or four mouldings; but in the other orders allows from seven to twelve. According to the same rule, the mouldings ought to be few in number, in the entablature of the first order; whilst, on the contrary, they may be increased in the Ionic and Corinthian entablatures.

Hence with regard to cornices in general, it is necessary that the divisions or different masses of mouldings of which they are composed, be well marked; whence springs the movement in profiles. In the cornices belonging to the first order, two divisions or masses of mouldings are employed; in those of the other orders, three at least are employed. The lesser mouldings, such as fillets and astragals, are in all profiles destined to serve as passages to the principal mouldings, and to give them relief. The principal mouldings are, the cyma recta, larmier, quarter round, cavetto, cyma talon, &c. It is essential to the perfection of a profile, that each of the mouldings be well expressed, and present the natural form that it ought to have. The same remark applies to the cyma recta and cyma talon, which are each formed by two continued curves, but opposite in their deve-

lopments, and described by similar radii; in such a manner that one is in projection and the other in retreat. These two mouldings are inverse the one to the other. The modillion, as forming part of the cornice, ought to present in its length or projection, double its breadth, while the dentils cannot exceed double their breadth in height; the interdentil, or space which separates them, should not exceed half the breadth of each dentil.

As to the profiles of architraves, and archivolts, they ought to be of different proportions, whatever number of mouldings be admitted. The fascias should always exceed each other in their proportions, in such a manner, that the uppermost, which is always crowned by some moulding, be of the greatest dimensions; projecting over the next inferior fascia.

But if there are rules for the disposition of profiles, with regard to the orders in general, there are also others which relate to the disposition of mouldings combined together. It would be contrary to correct taste, to place mouldings indiscriminately near each other; because on their combination depends the elegance of profiles. Thus the cyma recta ought always to be immediately surmounted by a fillet or face, and to have an astragal or fillet below it. The cyma talon should be crowned in the same manner; but it ought never to be situated near to a quarter round, whether it be placed above or below. The same moulding separated only by a fillet, would have a bad effect; but the cyma talon may be placed upon an even face of any dimensions whatever. This rule is applicable to the quarter round and cavetto. The astragal and fillet are not subjected with such seve-

rity to these rules, being employed discretionally. The torus often requires two fillets, or to be environed by even parts, as the socle or plinth: the scotia also requires two fillets. That indispensable member in all cornices, the larmier, which is essential to their preservation and the effect of the profile, ought to occupy the predominant part of their projection; and although we can cite examples, even in antiquity, where this member is suppressed, the suppression is a real fault, which it is essential to avoid.

THE DORIC ORDER.

Every thing tends to prove the high antiquity of this first of the orders of architecture. It may be looked upon as the generating principle of all proportion in this art; of which it is easy to be convinced, by attentively considering that the other orders, namely, the Ionic and Corinthian, have the same principal members as the Doric. All three have a shaft, capital, architrave, frieze, and cornice. They only differ from each other by the greater or less number of their parts, and the elegance and magnificence which respectively belong to them. The Doric, however, amongst the ancients, was never employed with a base; although the moderns have invariably given one to each of these three orders.

Vitruvius is the only author of antiquity whose writings upon architecture have been transmitted to us; it is to him that we are indebted for the scale of proportion that the ancients employed in the construction of their edifices. But what this architect relates

GENERA

OST CELEBRATE

ED TO IT B

ico of Philip y of Macedo- in the Isle of Delos.					*at*
ht he n- s.	Projection from the axis of the Columns.				He of M b
Fractions.	Modules.	Parts.	Fractions.		Modules.
..	1	28	..		1
...	....	28	..		1
..	...	28	½		1
-	-	-	-		3
⅝	1	1	½		1
⅜	{.. {1	25 ..	½ ..		14
..	....	..	..		..
-	-	-	-		15
-	-	-			1
.	....	..	..		
..	....	..	...		.
.	....	..	...		
-	-	-	-		-
ht n- .	From face of Arcades.				I o
..	....	..	..		.
..	....	..	..		.
..	....	..	..		.
..	....	..	..		.
t.	Width.				h
..	7	5	..		.
	....	..	..		.
..	....	..	..		.
.	....	..	..		.
..	....	..	..		.

h base, and 17
le in height, a

employed in th

A COMPARATIVE TABLE OF THE GENERAL PROPORTIONS OF THE DORIC ORDER.

FROM THE MOST CELEBRATED EDIFICES OF ANTIQUITY.

TOGETHER WITH THOSE ASSIGNED TO IT BY THE MOST EMINENT MODERN MASTERS.

Great Temple of Pæstum.

	Height of the Members. Modules.	Parts.	Fractions.	Projection from the axis of the Columns. Modules.	Parts.	Fractions.
Entablature: Cornice		28		1	23	½
Entablature: Frieze	1	2	½		20	¼
Entablature: Architrave	1	11	½		23	½
	3	12	-	-	-	-
Column: Capital	1	2	¾	1	6	
Column: Shaft	7	12	½	 1	20 	
Column: Base						
	8	15	-	-	-	-
Height of the Column and Entablature	11	27	-	-	-	-
Pedestal: Cornice						
Pedestal: Die						
Pedestal: Base						
	-	-	-	-	-	-
	Height of members			From face of Arcades.		
Impost						
Archivolt						
Key of Arcades without Pedestals						
Key of Arcades with Pedestals						
	Height.			Width.		
Intercolumniations, from axis to axis				4	10	
Columns of Arcades without Pedestals, from axis to axis						
Apertures of Arcades without Pedestals						
Columns of Arcades with Pedestals, from axis to axis						
Apertures of Arcades with Pedestals						

Temple of Apollo, in the Isl of Delos.

	Height of the Members. Modules.	Parts.	Fractions.	Projection from the axis of the Columns. Modules.	Parts.	Fractions.
Entablature: Cornice	1	7	½	2	3	½
Entablature: Frieze	1	7			29	½
Entablature: Architrave	1	20		1		½
	4	4	½	-	-	-
Column: Capital	1	3		1	5	
Column: Shaft	9	22		 1	22 	¼
Column: Base						
	10	25		-	-	-
Height of the Column and Entablature	14	29	½	-	-	-
Pedestal: Cornice						
Pedestal: Die						
Pedestal: Base						
	-	-	-	-	-	-
	Height of members.			From face of Arcades.		
Impost						
Archivolt						
Key of Arcades without Pedestals						
Key of Arcades with Pedestals						
	Height.			Width.		
Intercolumniations, from axis to axis				4	25	
Columns of Arcades without Pedestals, from axis to axis						
Apertures of Arcades without Pedestals						
Columns of Arcades with Pedestals, from axis to axis						
Apertures of Arcades with Pedestals						

Temple of Theseus, at Athens.

	Height of the Members. Modules.	Parts.	Fractions.	Projection from the axis of the Columns. Modules.	Parts.	Fractions.
Entablature: Cornice		25	½	2	4	½
Entablature: Frieze	1	25			29	½
Entablature: Architrave	1	20		1	2	¼
	4	11	-	-	-	-
Column: Capital	1			1	4	½
Column: Shaft	10			 1	23 	½
Column: Base						
	11	-	-	-	-	-
Height of the Column and Entablature	15	11	-	-	-	-
Pedestal: Cornice						
Pedestal: Die						
Pedestal: Base						
	-	-	-	-	-	-
	Height of members.			From face of Arcades.		
Impost						
Archivolt						
Key of Arcades without Pedestals						
Key of Arcades with Pedestals						
	Height.			Width.		
Intercolumniations, from axis to axis				5	6	
Columns of Arcades without Pedestals, from axis to axis						
Apertures of Arcades without Pedestals						
Columns of Arcades with Pedestals, from axis to axis						
Apertures of Arcades with Pedestals						

Exterior Port co of the Temple of Minerva, at Athens.

	Height of the Members. Modules.	Parts.	Fractions.	Projection from the axis of the Columns. Modules.	Parts.	Fractions.
Entablature: Cornice		26		1	26	½
Entablature: Frieze	1	19	½		25	½
Entablature: Architrave	1	14	½	1		½
	4	-	-	-	-	-
Column: Capital		28		1	2	½
Column: Shaft	10	2		 1	23 	¾
Column: Base						
	11	-	-	-	-	-
Height of the Column and Entablature	15	-	-	-	-	-
Pedestal: Cornice						
Pedestal: Die						
Pedestal: Base						
	-	-	-	-	-	-
	Height of members.			From face of Arcades.		
Impost						
Archivolt						
Key of Arcades without Pedestals						
Key of Arcades with Pedestals						
	Height.			Width.		
Intercolumniations, from axis to axis				4	20	
Columns of Arcades without Pedestals, from axis to axis						
Apertures of Arcades without Pedestals						
Columns of Arcades with Pedestals, from axis to axis						
Apertures of Arcades with Pedestals						

Portico of Philip King of Macedonia, in the Isle of Delos.

	Height of the Members. Modules.	Parts.	Fractions.	Projection from the axis of the Columns. Modules.	Parts.	Fractions.
Entablature: Cornice		25		1	28	
Entablature: Frieze	1	14			28	
Entablature: Architrave	1	9			28	½
	3	18	-	-	-	-
Column: Capital		21	⅝	1	1	½
Column: Shaft	11	28	⅜	 1	25 	½
Column: Base						
	12	20	-	-	-	-
Height of the Column and Entablature	16	8	-	-	-	-
Pedestal: Cornice						
Pedestal: Die						
Pedestal: Base						
	-	-	-	-	-	-
	Height of members.			From face of Arcades.		
Impost						
Archivolt						
Key of Arcades without Pedestals						
Key of Arcades with Pedestals						
	Height.			Width.		
Intercolumniations, from axis to axis				7	5	
Columns of Arcades without Pedestals, from axis to axis						
Apertures of Arcades without Pedestals						
Columns of Arcades with Pedestals, from axis to axis						
Apertures of Arcades with Pedestals						

Discovered at Albano, near Rome.

	Height of the Members. Modules.	Parts.	Fractions.	Projection from the axis of the Columns. Modules.	Parts.	Fractions.
Entablature: Cornice	1	5		2	21	
Entablature: Frieze	1	15		1	3	
Entablature: Architrave	1			1	4	
	3	20	-	-	-	-
Column: Capital	1			1	8	
Column: Shaft	14			 1	28 	
Column: Base						
	15	-	-	-	-	-
Height of the Column and Entablature	18	20	-	-	-	-
Pedestal: Cornice						
Pedestal: Die						
Pedestal: Base						
	-	-	-	-	-	-
	Height of members.			From face of Arcades.		
Impost						
Archivolt						
Key of Arcades without Pedestals						
Key of Arcades with Pedestals						
	Height.			Width.		
Intercolumniations, from axis to axis						
Columns of Arcades without Pedestals, from axis to axis						
Apertures of Arcades without Pedestals						
Columns of Arcades with Pedestals, from axis to axis						
Apertures of Arcades with Pedestals						

Theatre of Marcellus, at Rome.

	Height of the Members. Modules.	Parts.	Fractions.	Projection from the axis of the Columns. Modules.	Parts.	Fractions.
Entablature: Cornice	1	6	¾	2	25	
Entablature: Frieze	1	18			27	½
Entablature: Architrave	1	1			27	¾
	3	23	¾	-	-	-
Column: Capital	1	2	½	1	8	⅜
Column: Shaft	14	15	½	 1	23 	⅜
Column: Base						
	15	18	-	-	-	-
Height of the Column and Entablature	10	11	¾	-	-	-
Pedestal: Cornice						
Pedestal: Die						
Pedestal: Base						
	-	-	-	-	-	-
	Height of members.			From face of Arcades.		
Impost	1	9	½		15	⅜
Archivolt						
Key of Arcades without Pedestals						
Key of Arcades with Pedestals						
	Height.			Width.		
Intercolumniations, from axis to axis						
Columns of Arcades without Pedestals, from axis to axis				10	2	⅜
Apertures of Arcades without Pedestals	13	25	½	5	25	
Columns of Arcades with Pedestals, from axis to axis						
Apertures of Arcades with Pedestals						

Thermæ of Dioclesian, at Rome.

	Height of the Members. Modules.	Parts.	Fractions.	Projection from the axis of the Columns. Modules.	Parts.	Fractions.
Entablature: Cornice	1	16		2	13	
Entablature: Frieze	1	15			27	
Entablature: Architrave	1	2		1	1	¼
	4	3	-	-	-	-
Column: Capital	1			1	9	
Column: Shaft	15			 1	25 	
Column: Base						
	16	-	-	-	-	-
Height of the Column and Entablature	20	3	-	-	-	-
Pedestal: Cornice						
Pedestal: Die						
Pedestal: Base						
	-	-	-	-	-	-
	Height of members.			From face of Arcades.		
Impost						
Archivolt						
Key of Arcades without Pedestals						
Key of Arcades with Pedestals						
	Height.			Width.		
Intercolumniations, from axis to axis						
Columns of Arcades without Pedestals, from axis to axis						
Apertures of Arcades without Pedestals						
Columns of Arcades with Pedestals, from axis to axis						
Apertures of Arcades with Pedestals						

PALLADIO.

	Height of the Members. Modules.	Parts.	Fractions.	Projection from the axis of the Columns. Modules.	Parts.	Fractions.
Entablature: Cornice	1	8		2	16	
Entablature: Frieze	1	15			28	
Entablature: Architrave	1			1		½
	3	23	-	-	-	-
Column: Capital	1			1	9	
Column: Shaft	14			 1	26 	
Column: Base	1			1	10	
	16	-	-	-	-	-
Height of the Column and Entablature	19	23	-	-	-	-
Pedestal: Cornice		20		1	26	
Pedestal: Die	4	20		1	10	
Pedestal: Base	1	8	½	1	26	
	6	18	½	-	-	-
	Height of members.			From face of Arcades.		
Impost	1	8			15	
Archivolt		25	½		6	
Key of Arcades without Pedestals						
Key of Arcades with Pedestals	1	15				
	Height.			Width.		
Intercolumniations, from axis to axis				7	15	
Columns of Arcades without Pedestals, from axis to axis						
Apertures of Arcades without Pedestals						
Columns of Arcades with Pedestals, from axis to axis	17			15		
Apertures of Arcades with Pedestals	22	4	½	11	18	

SCAMOZZI.

	Height of the Members. Modules.	Parts.	Fractions.	Projection from the axis of the Columns. Modules.	Parts.	Fractions.
Entablature: Cornice	1	17		2	20	
Entablature: Frieze	1	15			28	
Entablature: Architrave	1	5			29	
	4	7	-	-	-	-
Column: Capital	1			1	5	
Column: Shaft	15			 1	24 	
Column: Base	1			1	12	
	17	-	-	-	-	-
Height of the Column and Entablature	21	7	-	-	-	-
Pedestal: Cornice		22	½	1	27	
Pedestal: Die	2	8	½	1	12	
Pedestal: Base	1	15	½	1	26	½
	4	16	½	-	-	-
	Height of members.			From face of Arcades.		
Impost		28			11	
Archivolt		27			5	
Key of Arcades without Pedestals	1	15				
Key of Arcades with Pedestals	1	22	½			
	Height.			Width.		
Intercolumniations, from axis to axis				5 7	 15	
Columns of Arcades without Pedestals, from axis to axis				12	15	
Apertures of Arcades without Pedestals	18	15		8	11	
Columns of Arcades with Pedestals, from axis to axis				15		
Apertures of Arcades with Pedestals	19	24		10	15	

VIOLA.

	Height of the Members. Modules.	Parts.	Fractions.	Projection from the axis of the Columns. Modules.	Parts.	Fractions.
Entablature: Cornice	1	10		2	15	
Entablature: Frieze	1	15		1		
Entablature: Architrave	1			1	1	
	3	25	-	-	-	-
Column: Capital	1			1	8	
Column: Shaft	14			 1	28 	½
Column: Base	1			1	10	
	16	-	-	-	-	-
Height of the Column and Entablature	19	25	-	-	-	-
Pedestal: Cornice						
Pedestal: Die						
Pedestal: Base						
	-	-	-	-	-	-
	Height of members.			From face of Arcades.		
Impost						
Archivolt						
Key of Arcades without Pedestals						
Key of Arcades with Pedestals						
	Height.			Width.		
Intercolumniations, from axis to axis						
Columns of Arcades without Pedestals, from axis to axis						
Apertures of Arcades without Pedestals						
Columns of Arcades with Pedestals, from axis to axis						
Apertures of Arcades with Pedestals						

PHILIBERT DE LORME.

	Height of the Members. Modules.	Parts.	Fractions.	Projection from the axis of the Columns. Modules.	Parts.	Fractions.
Entablature: Cornice	1	10		2	6	
Entablature: Frieze	1	15			28	
Entablature: Architrave	1			1		
	3	25	-	-	-	-
Column: Capital	1			1	10	
Column: Shaft	14			 1	26 	
Column: Base	1			1	15	
	16	-	-	-	-	-
Height of the Column and Entablature	19	25	-	-	-	-
Pedestal: Cornice						
Pedestal: Die						
Pedestal: Base						
	-	-	-	-	-	-
	Height of members.			From face of Arcades.		
Impost						
Archivolt						
Key of Arcades without Pedestals						
Key of Arcades with Pedestals						
	Height.			Width.		
Intercolumniations, from axis to axis						
Columns of Arcades without Pedestals, from axis to axis						
Apertures of Arcades without Pedestals						
Columns of Arcades with Pedestals, from axis to axis						
Apertures of Arcades with Pedestals						

VIGNOLA. Mutule.

	Height of the Members. Modules.	Parts.	Fractions.	Projection from the axis of the Columns. Modules.	Parts.	Fractions.
Entablature: Cornice	1	15		2	25	
Entablature: Frieze	1	15			26	¼
Entablature: Architrave	1			1		
	4	-	-	-	-	-
Column: Capital	1			1	7	½
Column: Shaft	14			 1	25 	
Column: Base	1			1	11	½
	16	-	-	-	-	-
Height of the Column and Entablature	20	-	-	-	-	-
Pedestal: Cornice						
Pedestal: Die						
Pedestal: Base						
	-	-	-	-	-	-
	Height of members.			From face of Arcades.		
Impost						
Archivolt						
Key of Arcades without Pedestals						
Key of Arcades with Pedestals						
	Height.			Width.		
Intercolumniations, from axis to axis						
Columns of Arcades without Pedestals, from axis to axis						
Apertures of Arcades without Pedestals						
Columns of Arcades with Pedestals, from axis to axis						
Apertures of Arcades with Pedestals						

VIGNOLA. Denticulated.

	Height of the Members. Modules.	Parts.	Fractions.	Projection from the axis of the Columns. Modules.	Parts.	Fractions.
Entablature: Cornice	1	15		2	25	
Entablature: Frieze	1	15			26	¼
Entablature: Architrave	1				28	¾
	4	-	-	-	-	
Column: Capital	1			1	8	¾
Column: Shaft	14			 1	2	
Column: Base	1			1	12	½
	16	-	-	-	-	
Height of the Column and Entablature	20	-	-	-	-	-
Pedestal: Cornice		15		1	27	½
Pedestal: Die	4			1	12	½
Pedestal: Base		25		1	23	½
	5	10	-	-	-	-
	Height of members.			From face of Arcades.		
Impost	1		½		10	
Archivolt	1				9	
Key of Arcades without Pedestals						
Key of Arcades with Pedestals						
	Height.			Width.		
Intercolumniations, from axis to axis				7	15	
Columns of Arcades without Pedestals, from axis to axis				10		
Apertures of Arcades without Pedestals	14			7		
Columns of Arcades with Pedestals, from axis to axis				15		
Apertures of Arcades with Pedestals	20			10		

The height given by Palladio to the Doric column is 15 modules when employed without base, 16 modules with base, and 17 modules when placed upon a pedestal.

Scamozzi has placed a socle under the bases of the columns of arcades without pedestals, of this order, 1 module in height, and 1 module and 15 parts in projection from the axis of the column. And his point of centre for describing the semicircular head of the arcades adapted to each of the orders is, for the Tuscan 10, and for the other orders 15 parts, above the impost.

☞ The module employed in this table is divided into thirty parts.

VIGNOLA,

TOGHTABLATURES, AS ALSO OF THOSE OF THE

UMN AND PEDESTAL

Imou to the two Entablatures.

PLATES 5, 7, & 8.

		Heights.			Projections from axis of Columns.		
		Modules.	Parts or Minutes.	Fractions.	Modules.	Parts or Minutes.	Fractions.
	D. CAPITAL.						
	Fillet	..	....	½	1	3	½
	Cyma Talon	..	1	..	1	3	¼
	Abacus	..	2	½	1	2	..
	Quarter Round	..	2	½	1	1	¾
	Three Fillets	..	1	½	....	11	½
	Collarin	..	4	..	....	10	..
		1	-	-			
	SHAFT.						
	Astragal	..	1	..	1	....	..
1	Fillet	..	....	½	....	11	½
Entab es.	Conge	..	1	½	....	10	..
4 mod	Shaft between Conges	13	7	..	.. 1	10	.. ..
	Conge	..	2	..	1	....	..
		14	-	-			
	E. BASE.						
	Fillet	..	...	⅔	1	2	..
	Astragal	..	1	⅓	1	2	¾
	Torus	..	4	..	1	5	..
	Plinth	..	6	..	1	5	..
		1	-	-			
	F. CORNICE.						
	Fillet	..	....	½	1	11	..
	Quarter Round	..	1	..	1	10	¾
	Fillet	..	....	½	1	9	¾
	Corona	..	2	½	1	9	..
	Cyma Talon	..	1	½	1	6	½
D. Pla		-	6	-			
E. Plan	DIE.						
F Ele parts.	Die	3	11	..	1	5	..
	Conge	..	1	..	1	5	..
		4	-	-			
• Th	G. BASE.						
	Fillet	..	..	½	1	6	..
	Astragal	..	1	..	1	6	½
	Cyma Reversa	..	2	..	1	7	..
	First Plinth	..	2	½	1	9	..
	Second Plinth	..	4	..	1	9	½
		-	10	-			
	Total	25	4	-			

MUTULE AND DENTICULATED DORIC ENTABLATURES OF VIGNOLA,

AND THE COLUMN AND PEDESTAL COMMON TO BOTH,

TOGETHER WITH THE NAMES AND DETAILED PROPORTIONS OF THE MEMBERS AND MOULDINGS OF THE TWO ENTABLATURES, AS ALSO OF THOSE OF THE COLUMN AND PEDESTAL.

MUTULE DORIC ENTABLATURE. PLATES 5 & 6.

		Heights.			Projections from axis of Columns.		
		Modules.	Parts or Minutes.	Fractions.	Modules.	Parts or Minutes.	Fractions.
Entablature 4 modules.	A. CORNICE.						
	Fillet	..	1	..	2	10	..
	Cyma Recta	..	3	..	2	7	..
	Fillet	..	....	½	2	7	..
	Cyma Talon	..	1	..	2	6	¾
	Corona	..	3	½	2	6	..
	Cyma Talon	..	1	..	2	5	½
	Mutule	..	3	..	2	4	½
	* Canal	..	....	½	2	4	
	Drop of the Mutule	..	....	½	2	2	..
	Quarter Round	..	2	..	1	1	½
	Fillet	..	...	½	....	11	½
	Capital of the Triglyph	..	2	..	....	11	..
		1	6				
	B. FRIEZE.						
	Triglyph	1	6	..	....	10	½
	Metope	1	6	..	....	10	..
		1	6	-			
	C. ARCHITRAVE.						
	Tenia	..	2	..	1	....	..
	Capital of the Drops	..	....	½	....	11	½
	Drops	..	1	½	....	11	½
	First Fascia	..	6	..	....	10	½
	Second Fascia	..	4	..	....	10	..
		1	-	-			

D. Plan of a Triglyph on a double scale

E. Plan of round and square Drops.

F Elevation of a Triglyph and Drops

* The height of the canal is included in that of the mutule.

DENTICULATED DORIC ENTABLATURE. PLATES 7 & 8.

		Heights.			Projections from axis of Columns		
		Modules.	Parts or Minutes.	Fractions.	Modules.	Parts or Minutes.	Fractions.
Entablature 4 modules.	A. CORNICE.						
	Fillet	..	1	..	2	10	..
	Cavetto	..	3	..	2	7	..
	Fillet	..	...	½	2	6	½
	Cyma Talon	..	1	½	2	6	..
	Corona	..	4	..	2	4	½
	* Canal	..	....	½	2	3	½
	Fillet	..	....	½	2	2	..
	Drops under the Corona	..	....	½	2	....	½
	* Dentil	..	3	..	1	3	..
	Fillet	..	....	½	1	1	..
	Cyma Talon	..	2	..	1	....	½
	Capital of the Triglyph	..	2	..	....	11	..
		1	6	-			
	B. FRIEZE.						
	† Triglyph	1	6	..	....	10	½
	† Metope	1	6	..	....	10	..
		1	6	-			
	C. ARCHITRAVE.						
	Tenia	..	2	..	....	11	½
	‡ Capital of the Drops	..	....	½	....	11	..
	‡ Drops	..	1	½	....	11	..
	Fascia	..	10	..	....	10	..
		1	-	-			

* The canal and dentil take each half a part in height from the soffit of the corona. See plate 8.

† Only one of these two parts should be taken for the height of the frieze.

‡ The capital of the drops, and the drops, are included in the fascia

COLUMN AND PEDESTAL *Common to the two Entablatures.* PLATES 5, 7, & 8.

		Heights.			Projections from axis of Columns.		
		Modules.	Parts or Minutes.	Fractions.	Modules.	Parts or Minutes.	Fractions.
Column 16 modules.	D. CAPITAL.						
	Fillet	..	....	½	1	3	½
	Cyma Talon	..	1	..	1	3	¼
	Abacus	..	2	½	1	2	..
	Quarter Round	..	2	½	1	1	¾
	Three Fillets	..	1	½	....	11	½
	Collarin	..	4	..	....	10	..
		1	-	-			
	SHAFT.						
	Astragal	..	1	..	1	....	..
	Fillet	..	....	½	....	11	½
	Conge	..	1	½	....	10	..
	Shaft between Conges	13	7	..	.. 1	10	.. ..
	Conge	..	2	..	1	....	..
		14	-	-			
	E. BASE.						
	Fillet	..	...	⅔	1	2	..
	Astragal	..	1	⅓	1	2	¾
	Torus	..	4	..	1	5	..
	Plinth	..	6	..	1	5	..
		1	-	-			
Pedestal 5 mod. 4 parts.	F. CORNICE.						
	Fillet	..	....	½	1	11	..
	Quarter Round	..	1	..	1	10	¾
	Fillet	..	....	½	1	9	¾
	Corona	..	2	½	1	9	..
	Cyma Talon	..	1	½	1	6	½
		-	6	-			
	DIE.						
	Die	3	11	..	1	5	..
	Conge	..	1	..	1	5	..
		4	-	-			
	G. BASE.						
	Fillet	..	..	½	1	6	..
	Astragal	..	1	..	1	6	¾
	Cyma Reversa	..	2	..	1	7	..
	First Plinth	..	2	½	1	9	..
	Second Plinth	..	4	..	1	9	½
		-	10	-			
	Total	25	4	-			

☞ The module employed in this Table is divided into twelve parts

to us of the origin of each order, is insufficient to satisfy an enlightened inquiry; since he rests what he has said of the different orders, so much upon fable.

This author, speaking of the Doric order, says, "Dorus, son of Helenus, king of Achaia and of all Peloponnesus, and of the nymph Optice, having caused a temple to be built to Juno, in the ancient city of Argos, which was of the style that we call Doric: afterwards this order was employed in all the other cities of Achaia, without having as yet any established rule for the proportions of its architecture. But as they, the Greeks, were unacquainted with the proportion that it was necessary to give to columns, they sought the means of making them sufficiently strong to sustain the weight of the edifice, and to render them agreeable to the view. For that end they took the measure of the foot of a man, which is the sixth part of his height; according to which they formed their columns. In proportion to the thickness of the foot of the column, they made it six times that height, including the capital: and thus the Doric column, which was first employed in edifices, had the proportion, strength, and beauty of the body of man."

The opinion of Vitruvius, on the origin of the Doric order, does not appear to be more exact than the rules which he gives relative to it; and without directly attacking the fable which he relates, the observations shall more particularly be confined to the proportions which he prescribes; because they have an essential relation to the subject under examination. He supposes that in its origin, there were given to the columns of this order, six diameters for its height; that is to say, six times its breadth. It is at least surprising

that this learned architect, in treating on the orders, has not distinguished the different proportions under twelve modules, or six diameters; and the surprise is not lessened, when we consider that he lived during the reign of Augustus, and had under his eyes many temples and other edifices of the Doric order. Examples of this order may be found in Greece that are less than four diameters in height.

Without recurring to the fable of Vitruvius, in order to fix the precise epoch of the origin of the Doric order, it appears much more conformable to probability, that, as it is the principle of architecture, it takes its date from the earliest state of society. This order, which, in its origin, was shapeless and rude, gradually emerged from its state of disproportion, and acquired those proportions which rendered it lighter to the view, and more relatively useful.

Examination will prove the truth of the above remarks, for which purpose the different antique monuments will serve as examples. It perhaps will not be necessary in enumerating this class of the remains still existing in Greece, to offer any earlier examples than those which may be the most profitably referred to. The earliest examples of the Doric order, in Greece and Sicily, exhibit short and massive columns, with capitals of an immense projection; which appear as if they were crushed under the excessive weight of their entablatures. They present nothing imposing but their mass; their composition offering no particular parts from which any advantages may be derived.

The proportion of the columns of two of the six temples of Selinus, is 3⅞ diameters. At Corinth, 4⅙ dia. At Pæstum, 4 dia.: as also 4⅓ dia. At Agrigentum,

4⅔ dia. and 4⅘ dia. At Segresta, 4¾ dia. And at Syracuse, 4⅘ dia.

The echinus of their capitals underwent, in the progress of this order, three striking variations. In the capitals of the columns at Thoricus and Delos, the inclined face of the intended moulding forms a straight line. Pæstum presents a second species, having a slight curve. And lastly, those of a later date at Athens, gradually approaching nearer to the form of a quarter round.

The diminutions of the shafts of the columns, have undergone equal alterations. This diminution in the columns at Syracuse, is almost one module; whilst those at Athens of a later period, have less by one half, not having quite a fourth of the diameter. The relation between the height of the entablature and that of the columns, is at Pæstum and Syracuse, as 1 to 2 and ⅓; and at Agrigentum, at 1 to 2 and ½.

The architrave has generally ¾ of a diameter; the frieze an entire diameter; whilst the cornice has often but the fourth of a diameter.

The intercolumniations of the columns at Pæstum, Corinth, and Sêgresta, are but of one diameter; at Syracuse they are less than a diameter.

Commencing then with the temple of Theseus at Athens, which is situated to the left, as you proceed to the academy, and is remarkable for the fetes which the ancients there solemnized in honour of this hero, and by the distributions of flour which were made to the poor of the city. But that which best serves to prove the veneration of the Athenians for their founder, is their having made this temple an inviolable refuge for menials from the abusive treatment of their masters.

It was erected after the battle of Marathon, dedicated during the victories of Cimon, and was repaired, as many other edifices were, by Adrian.

This temple is of the Doric order, and presents six columns at its entrance façade, the same number at the opposite extremity, and thirteen at the sides; thus forming a peristyle around the whole. The interior of its cella offers a parallelogram of twice and a half its breadth in length. The application of Antæ is confined to the exterior angles of the cella, the situation of which does not, however, exactly correspond with any of the columns either in face or return; the reason of which appears to have been, to obtain a convenient width for the peristyle, without affecting the necessary harmony between the ordonnance and intercolumniations. This inaccuracy of correspondence of the Antæ with the opposite columns, cannot, in the present instance, be considered a defect, inasmuch as it is not perceivable in execution.

The columns have for basement two lofty steps, each two-thirds of a module in height. Their diameter is 3 feet 6 inches, and their height including the capital, 18 feet 8 inches and 9 lines; that of their capital being 1 foot 9 inches or 1 module. The entablature is 7 feet 7 inches in height, of which the architrave is 2 feet 11 inches, the frieze 3 feet 2½ inches, and the cornice 1 foot 5½ inches. The pediment situated at each extremity, presents an inclination of fifteen degrees. The centre intercolumniation is 5 modules 6 parts, from axis to axis; the others are a little less. The ceiling exhibits a striking imitation, executed on marble, of the tie-beams of the roof extending from the triglyphs to the wall of the cella The metopes

of the eastern elevation present bass-reliefs, representing, in ten designs, the labours of Hercules, and on eight of the metopes situated in return, are sculptured the achievements of Theseus. Casts, taken from four and twenty of its metopes, form a part of the collection in the British Museum.

In conclusion, it may be observed, that the general harmony of this temple is so well preserved, that it may be considered a very valuable model of its kind.

The temple of Minerva at Athens, also named the Parthenon, was erected by Ictinus and Callicrates, during the time of Pericles; to replace a former temple, which had been burnt by the Persians. Ictinus wrote a work, which has not descended to us, giving a description of this celebrated edifice. It is to the emperor Adrian that we are indebted for the repairs made in this, as also in the other edifices that this city contained; and of which, from their former good state of preservation, notwithstanding the ravages they have undergone, many remains still exist. This temple the situation of which was on an emimence in the centre of the citadel, elevated on all sides above the city, presents a plan in the form of a parallelogram, like the generality of those of the ancients, extending from east to west. Its peristyle consisted of a range of eight columns at the principal façade and opposite extremity; and seventeen at the sides. The entrance to the cella, either by the eastern or western façade, was preceded by a second range of six columns; in addition to which, at the latter entrance, was a spacious vestibule. The superior part or frieze of the exterior of the wall of the cella, is decorated by a basso rilievo, representing a procession to the same temple during the Panathenaic festival.

The whole was covered by a roof, extending in a straight line from one extremity of the pediment, situated above the entablature at each entrance, to the other ; forming one imposing total.

The ordonnance is Doric, the columns of which are raised upon three lofty steps, having a medium between a half and one third of a module in height ; the uppermost of which is 101 feet 2 inches in breadth, and 227 feet 7 inches in length. The diameter of the columns is 6 feet 1 inch and 8 lines, and their height, including their capitals, which is 2 feet 9 inches 9 lines, is 34 feet 2 inches and 6 lines. The height of the entablature is 12 feet 1 inch and 10 lines, of which the architrave is 4 feet 5 inches and 1 line, the frieze 4 feet 5 inches 1 line, and the cornice 3 feet 3 inches and 8 lines. The intercolumniations are 4 modules 20 parts from axis to axis.

The metopes are decorated with designs executed in alto rilievo, representing the battles of the Centaurs and Lapithæ, at the nuptials of Pirithous. Each metope contains two figures grouped in various attitudes. Each of the pediments was equally ornamented with sculpture. The one represents the birth of Minerva ; and the other relates to a dispute between Minerva and Neptune, concerning the possession of Attica, which is executed in extraordinary high relief.

The principal of the remaining fragments of these sculptural productions, have been transferred to the British Museum. They consist of some of the figures that formed a part of the compositions of the pediments ; a number of the metopes ; the whole remaining

frieze before mentioned, of which about two hundred and fifty feet is original; the remainder being in casts executed on the spot. From the excellence of their execution, there is little doubt that they were superintended by Phidias, and finished by his chisel; and perhaps, for the greater part, wrought by Alcamenes, his distinguished pupil. This temple, from the beauty of its total, is one of the most esteemed edifices of this ordonnance existing in Greece.

Many of the examples of the Doric order discovered in Greece, are, however, of a very difficult application, scarcely conformable to modern wants and customs, and can only with propriety be employed in such edifices as admit of great simplicity of plan, and a character of strength and solemnity.

One of the best examples of this order in Italy, was found at Albano, near Rome. The height of the column is seven diameters and a half, or fifteen modules; the capital of this column has a collarin, and its abacus is crowned with a fillet and cyma talon. The architrave is one module, the frieze one module and a half, and the cornice a module and one-fifth. With the exception of the defect in the architrave, this example may undoubtedly be pronounced a masterpiece. It appears to have served as the model for Vignola's mutule Doric, and is cited in the present instance in preference to the theatre of Marcellus, or the Thermæ of Dioclesian, the composition of which appears inferior. It is true that the order of the first of the two last-mentioned edifices has been generally and deservedly esteemed; but that of the latter has its capital soft and effeminately profiled; its cornice, which is too high, is composed of too many members,

and is of a proportion that disfigures the essential character of the order.

The columns of the theatre of Marcellus, at Rome, have nearly sixteen modules, or eight diameters, in height; their entablature is nearly four modules, which establishes its height at almost one-fourth of that of the column; and this proportion of one-fourth of the column, is still more precise in the Thermæ of Dioclesian. This rule is also observed with as much fidelity in the column belonging to the fragment found at Albano; it has but fifteen modules in height, and the entablature three and two-thirds, which also approaches to one-fourth.

Another example of this order, found in a tomb near Terracina, exhibits great beauty and largeness of division, in each of its parts. The columns are seven diameters in height.

The Doric columns at the quarters of the soldiers at Pompeia, are also seven diameters in height.

These are the principal and best examples of the Doric order, which the existing remains of Greece and Italy at this time present; in the whole of which examples it is employed without base. There were doubtless many temples and other edifices erected at Rome, of this order, which were destroyed during the middle ages. Labaco, in his work, published at Rome, in 1559, presents us with plates of the remains of three temples of this order which existed at that late period: and they were situated in the vicinity of the theatre of Marcellus.

Vignola's Doric entablature is of two kinds; the one is called mutule, and the other denticulated. The first is taken from the antiquities found in Italy, and is

ornamented with mutules, which are a kind of bracket, and serve to crown the triglyphs. The frieze is decorated with triglyphs of a module in breadth, subdivided into triangular flutes and half flutes. They should be placed directly over the columns, and divided from each other by a space called metope, equal to the height of the frieze. The shaft of the column is sometimes ornamented with flutings, or portions of a circle, to the number of twenty, which, in meeting, form a sharp angle.

The second Doric entablature is called denticulated, because its cornice is ornamented with dentils; it was taken from the theatre of Marcellus, at Rome. It differs from the mutule in its architrave, which has but one fascia; and in its cornice, in the lower part of which is placed a cyma talon, whilst the mutule has a quarter round; and in the upper part is placed a cavetto, whilst the other has a cyma recta. As the column and pedestal are the same in each of these two examples, to prevent repetition, their details will be given in the table and in plate 8, as being common to both.

The exclusive employment of the Doric and Ionic orders, discovered amongst the remains of Greece, as also of those presented in Italy, has each its partisans. The one party disclaims all but the examples offered in the former country; amongst which may be enumerated our English travellers, to whom we are mostly indebted for the discovery of them; whilst the other decries all but the latter. This party may be said chiefly to consist of such as are disinterested in the introduction of the former.

In proof, reference may be made not only to the

literary works of the first mentioned class, but likewise to their professional productions; in which the Grecian Doric, of the exact measurements of existing examples, has been introduced on almost all occasions, however injudicious the application.

As regards the opposite party, if equal reference be made to their writings, as also to the buildings and edifices designed by them, the same exclusive spirit will be manifested. Truth, as is commonly the case, lies midway between the two parties. For architecture, unlike those arts in which the rules are imperative, admits of modifications in all its constituent parts, which are governed by the character of the edifice, the situation of the site, &c., as is fully proved by the various examples of antiquity quoted in the accompanying tables.

If the proportions of architecture could be reduced to a determinate calculation, it would cease to be an art of invention and taste, and become nothing more than a mechanical art, in which every thing is subjected to rigorous rules. Though, by a strict observance of the rules and proportions of the ancients, we might succeed in producing examples similar in their abstract form; yet without the attendant circumstances which governed those artists in the choice of proportions and ordonnance, the application of such proportions and ordonnance would be a breach of the fundamental law of architecture, which demands that they shall be governed by the character and object of the edifice. The principles of calculation being absolute, can never be applied to architecture as the sole governing power. Such an application, by enslaving the artist to a system unchanged by circumstance, and

absolute in its rules, would destroy at once the principle of invention, and give a death-blow to the powers of the art. The orders of architecture, and the rules which govern the proportions of their details, are means only whereby an expression of character is given to an edifice; the judicious application of which characterizes genius, and distinguishes the man of talent from the mere copyist. Such of the constituent parts of architecture as apparently rest on a system of the most fixed proportions, and between which a constant and uniform relation exists, though unvarying in their regular and symmetrical organization, are nevertheless susceptible of being modified in their application according to the expression of character required. Architecture does not merely permit, but demands a latitude in the application of its parts, which is governed by the general intention. A comparison of the different edifices of antiquity, will prove the truth of these remarks, and render them more striking by exhibiting the fact. Whilst we discover in their works a uniformity of principles, we shall also find that variety in the details of the constituent parts which has been alluded to, and from which examples may be derived that knowledge of general expression, and judgment in distribution, which will serve to restrain the digressions of imagination within proper bounds, without enslaving the efforts of genius.

Hence, it is possible judiciously to profit from the spirit exhibited in the best examples found in both Greece and Italy. The Doric of the former country, in edifices presenting a simplicity of plan, and requiring a masculine and solemn expression; while those presented in the latter country are well calculated for

edifices that demand less severity of character. It may, however, be remarked, that there are but few modern edifices, in which the extreme of the expression of strength and solemnity can be judiciously applied, in proportion to the number of those requiring the intermediate shades.

THE IONIC ORDER.

It will easily be perceived, by a minute investigation of the progress of the Ionic order, that it has not been subject to the same variations in its principal divisions as the Doric; because the art had made some progress in the proportions of this first of the orders, and they served as a principle to the ancients in the composition of the two last.

Freart de Chambray, in treating on the origin of the Ionic order, says, "The first productions of the arts have always been very limited; because it is more difficult to invent than to imitate. After that regular buildings and the famous Doric temples had appeared, of which Vitruvius and some others have made mention, architecture did not long remain in its infancy: the competition and emulation of the neighbouring people caused it to make rapid progress in its advance towards perfection. The Ionians were the first competitors against the Dorians in this divine art; and as these people had not the fame of its invention, they endeavoured to enrich it more than its authors had

CH THE ORDER

ights.		Projections from axis of Columns.		
Parts or Minutes.	Fractions.	Modules.	Parts or Minutes.	Fractions.
1	..	1	2	..
2	..	1	1	½
1	..	....	17	½
3	..	....	17	..
5	..	1	4	..
12	-			
2	..	1	....	..
1	..	....	17	..
2	..	....	15	..
15	½	..	15	..
		1	....	..
2	..	1	....	..
1	½	1	2	..
6	-			
5	..	1	4	½
..	¼	1	2	½
2	..	1	2	..
....	¼	1	4	..
2	..	1	4	½
....	¼	1	4	..
2	..	1	3	..
...	¼	1	6	..
6	..	1	7	..
-	-			
...	⅔	1	17	..
1	⅓	1	16	¾
3	..	1	15	½
....	½	1	12	..
3	..	1	11	½
1	..	1	9	..
1	..	1	8	¼
10	-			
1	¼	1	7	..
12	¾	1	7	..
2	..	1	7	..
16	-			
1	..	1	9	..
1	⅓	1	10	..
3	..	1	9	½
....	⅔	1	13	⅔
4	..	1	15	..
10	¼			
9	-			

IONIC ORDER OF VIGNOLA,

WITH THE NAMES AND DETAILED PROPORTIONS OF THE MEMBERS AND MOULDINGS OF WHICH THE ORDER IS COMPOSED.

PLATES 9, 10, 12, and 21

	ENTABLATURE.	Heights			Projections from axis of Columns.		
		Modules.	Parts or Minutes.	Fractions.	Modules	Parts or Minutes.	Fractions.
Entablature 4 mod. 9 parts	A. CORNICE.						
	Fillet	..	1	½	2	10	..
	Cyma Recta	..	5	..	....	....	..
	Fillet	..	....	½	2	5	..
	Cyma Talon	..	2	..	2	4	½
	Corona	..	6	..	2	2	½
	* Fillet	..	1	..	1	11	¼
	Quarter Round	..	4	..	1	10	¼
	Astragal	..	1	..	1	7	..
	Fillet	..	....	½	1	6	½
	† String of the Dentils	..	1	½	1	3	..
	Dentils	..	6	..	1	6	..
	Rest of Band behind Dentils	.	1	..	1	2	..
	Cyma Talon	..	4	..	1	1	½
		1	13	½			
	B. FRIEZE.						
	Frieze	1	9	-	....	15	..
		1	9	-			
	C. ARCHITRAVE.						
	Fillet	..	1	½	1	2	..
	Cyma Talon	..	3	..	1	1	⅔
	First Fascia	..	7	½	....	17	..
	Second Fascia	..	6	..	....	16	..
	Third Fascia	..	4	½	....	15	..
		1	4	½			
	D. Section of the Capital and Baluster of the Volute	1	1	..	1	8	..
	E. Side elevation of the Capital and Baluster of the Volute	1	1	..	....	17	½

	COLUMN AND PEDESTAL.	Heights.			Projections from axis of Columns.		
		Modules.	Parts or Minutes.	Fractions.	Modules.	Parts or Minutes.	Fractions.
Column 18 modules.	D. E. CAPITAL.						
	Fillet	..	1	..	1	2	..
	Cyma Talon	..	2	..	1	1	½
	Fillet	..	1	..	....	17	½
	Canal of the Volute	..	3	..	....	17	..
	Quarter Round	..	5	..	1	4	..
		-	12	-			
	SHAFT.						
	Astragal	..	2	..	1	....	..
	Fillet	..	1	..	....	17	..
	Conge	..	2	..	....	15	..
	Shaft between Conges	15	15	½	.. 1	15	.. ..
	Conge	..	2	..	1	....	..
	Fillet	..	1	½	1	2	..
		16	6	-			
	F. BASE.						
	Torus	..	5	..	1	4	⅔
	Fillet	..	....	¼	1	2	½
	Scotia	..	2	..	1	2	..
	Fillet	..	....	¼	1	4	..
	Two Astragals	..	2	..	1	4	½
	Fillet	..	....	¼	1	4	..
	Scotia	..	2	..	1	3	..
	Fillet	..	....	¼	1	6	..
	Plinth	..	6	..	1	7	..
		1	-	-			
Pedestal 6 modules.	G. CORNICE.						
	Fillet	..	....	⅔	1	17	..
	Cyma Talon	..	1	½	1	16	¾
	Corona	..	3	..	1	15	½
	* Fillet	..	....	½	1	12	..
	Quarter Round	..	3	..	1	11	½
	Astragal	..	1	..	1	9	..
	Fillet	..	1	..	1	8	¼
		-	10	-			
	DIE.						
	Conge	..	1	¼	1	7	..
	Die	4	12	¾	1	7	..
	Conge	..	2	..	1	7	..
		4	16	-			
	H. BASE.						
	Fillet	..	1	..	1	9	..
	Astragal	..	1	⅓	1	10	..
	Cyma Reversa	..	3	..	1	9	½
	Fillet	..	....	⅔	1	13	⅔
	Plinth	..	4	..	1	15	..
		-	10	¼			
	Total	28	9	-			

* The height of the fillets in the cornice of the entablature and of the pedestal, are included in those of each corona

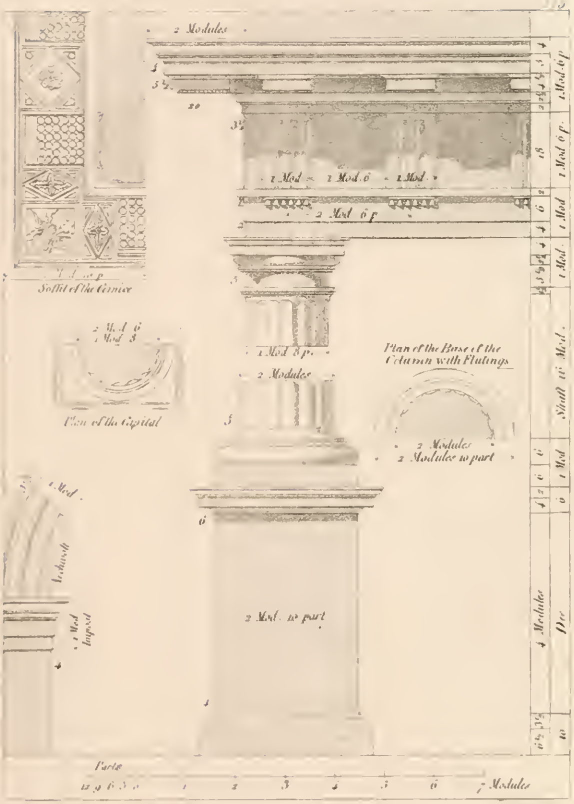
† The height of the string is included in that of the dentils.

The flutings of the shaft of the column of this order are separated by a fillet.

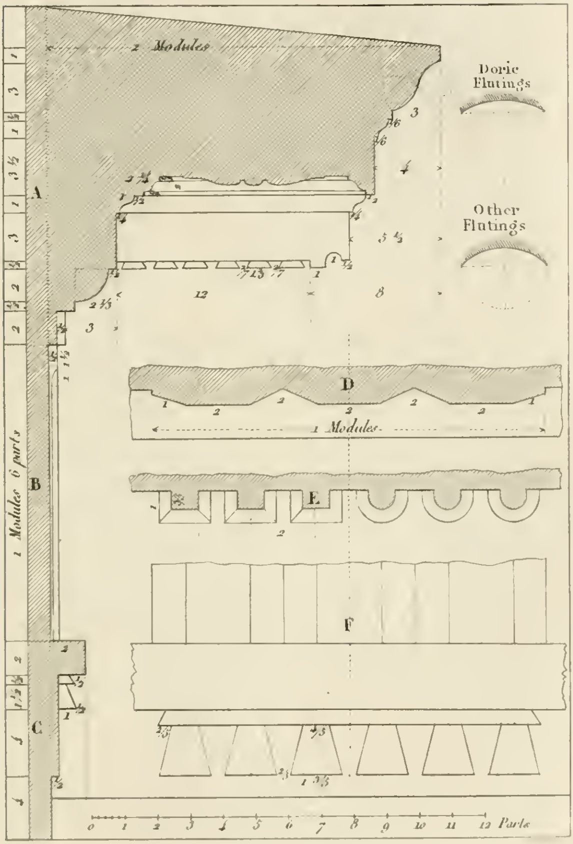
The attic base may be judiciously substituted for that given by Vignola to this order. For the form and dimensions of the attic base, see plates 9 and 10.

☞ The module employed in this Table is divided into eighteen parts.

MUTULE DORIC ORDER.



DETAILS OF THE MUTULE DORIC ORDER.



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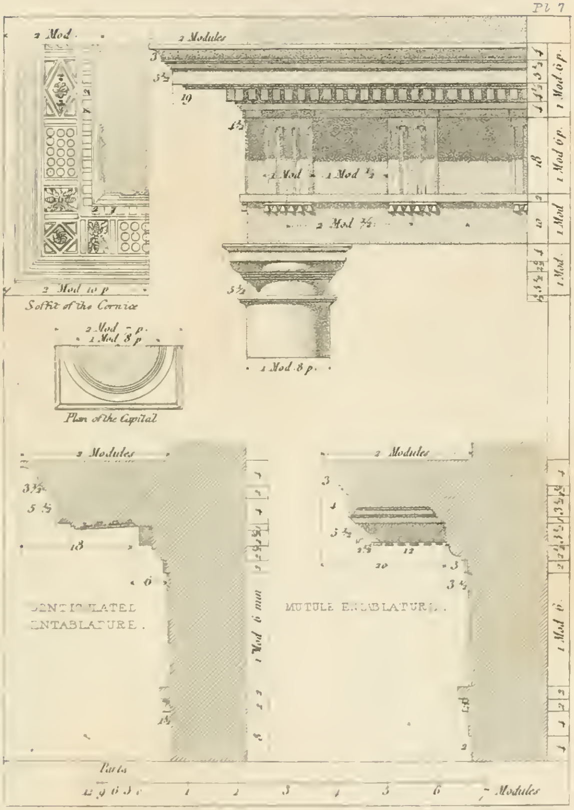
DENTICULATED DORIC ORDER.

Pl. 7



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DETAILS OF THE DENTICULATED DORIC ORDER

done." To this remark of Chambray's, it will not be uninteresting to add the grounds of his opinion. Vitruvius informs us, that Hermogenes, of Alabanda, having a great quantity of marble, intended for building a temple to Bacchus, and not having at that time any other models than the Doric order, but inspired by his genius, he discovered a mode not differing sensibly from the rules of this order, and executed it on a new design. As he was an inhabitant of Caria, of which the Ionians had made themselves the possessors, this manner of building acquired the name of Ionic.

Without proceeding further in this inquiry, or attaching any credit to the above fabulous account, it may be asserted, that this order, as forming a part in the system of the antique architecture, owes its invention neither to a single individual nor city ; but to the general progressive results of experience and talent at a very remote period.

The characteristic distinctions of the Ionic from the Doric order, are, firstly, in the form of its capital, the outline of its shaft, together with the addition of a base; and also in the profile of its entablature. Secondly, in the proportion of its column, and the relative proportion between this and the parts of the entablature. And thirdly, in its decoration, in the sculpture of the capital, as also of the mouldings in the entablature : the frieze either presenting a continued plain surface, or decorated with sculpture. Hence the Ionic differs from the Doric, both in its form, proportion, and decoration.

This second order, in some degree a rival to the first, made great progress. Experience having taught them to raise the Doric order in its proportions, the

Ionic also underwent additional improvement. Genius perfected both. The means were multiplied by observation, whence sprung that variety in the relations of the different orders; and these relations, taken and employed with judgment, became the source of an almost innumerable number of agreeable effects.

After having made thus far an inquiry into the conjectural origin of this order, it is not less essential that the various shades of character it exhibited be also examined; in doing which, recourse must be had to the examples presented to us, in the different antique edifices.

Minerva was held in such reverence by the Athenians, that they erected to this divinity two temples in the citadel; one of which has been described in treating of the Doric order, and the other, which was of less extent, was dedicated to Minerva Polias. The order is Ionic. Columns are employed only at its entrance; six of which form its peristyle, and four are engaged in the wall of the cella, forming the opposite extremity or posticum.

The peristyle is situated upon a flight of three steps; each of which are rather more than two-thirds of a module in height; the lower torus of the bases of the columns, are placed direct upon these; being without plinths. The bases are formed of three divisions, the heights of which decrease in a small degree as they rise; namely, a superior and inferior torus, having a scotia and two fillets intervening. It is probable that this base has served as the type for the one named attic. The columns, each of the shafts of which are decorated by twenty-four flutings, are two feet three inches and one line, in diameter, and in

height twenty-one feet, seven inches, and six lines, which includes the base and capital; the former of which is one foot, ten inches, and the latter eleven inches and three lines. That part of the capital, between the abacus and echinus, whence spring the volutes, is composed of three fillets, forming different curvatures; two of which descend very low. These three fillets present themselves in the volutes, and considerably augment the number of their revolutions, which gives the capital more variety and richness. Both these qualities are increased by the addition of a large collarin, placed under the echinus, and which descends lower than the volutes. This collarin is decorated with the palmetta; and the abacus and echinus are sculptured in oves. The nett height of the volutes is one foot four inches.

The entablature is four feet, ten inches, and ten lines in height; of which the architrave, composed of three fascias, is two feet one inch; its frieze is of a still greater height, when compared with the cornice, being one foot, eleven inches, and nine lines. The cornice is composed of a corona of large proportion, having a bold cyma talon sunk in the thickness, and under the soffit of this member. Above the corona is a fillet and echinus, which, from their smallness, makes it more than probable that the whole was terminated by a cyma recta; of which we have examples in the cornices of the portico of Philip, and in the temple of Apollo, at Delos, although of the Doric order. This moulding from its being the uppermost of an ordonnance, is necessarily the first which is subject to decay. The height of the cornice as it now remains, is only ten inches and one line: great relief is

given to the corona, by means of the small moulding, under and over, being sculptured. The whole was surmounted by a pediment. The intercolumniations are eight modules from axis to axis.

Against the left side of this temple, is another of small dimensions; dedicated to Pandrosia, one of the three daughters of Cecrops, who had continued faithful to the order of Minerva. Its façade presents the statues of four female figures, commonly named Caryatides, (one of which is in the British Museum,) there being also two in return on each side, (counting the one at each angle a second time,) which are situated upon a lofty continued pedestal; having a species of capital adjusted to their heads, for the better receiving the architrave and cornice. The frieze is suppressed, apparently to decrease the height of the part supported, and thereby to establish a just harmony between this and its supports.

The height of this imperfect entablature exceeds a third of that of the figures, the cornice being 1 foot, 6 inches, and the architrave 1 foot, 5 inches; the height of the statues are 7 feet, 1 inch; and of the total, including the pedestal, and the three steps on which it is planted, is 9 feet. The socle of the statues is 2 feet, 1 inch square, and the distance between them 3 feet, 4 inches, and 1 line. Some amongst the moderns have endeavoured to institute a new order on the authority of these antique remains. This vain determination proceeded from a misunderstanding on the part of such individuals, in what the necessary constituents of an order consist.

The introduction of these objects in an architectural composition, and their occupying the place of one of

the most essential parts, namely, the column, is of itself a license; and hence it is, that it can but rarely be judiciously employed.

The temple of Erectheus, situated at the opposite flank or right side of the temple of Minerva, was erected to replace a former one; the site of which likewise occupied a part of the Acropolis; and was destroyed by Xerxes on gaining possession of the citadel. This temple is composed of four columns in front, and two at its sides; counting the angular one a second time. The details of this temple are similar to those of Minerva Polias. The columns, the diameter of which is 2 feet, 5 inches, and 9 lines, in their height, including the base and capital, are 22 feet, 8 inches; the entablature is one-fourth of this height, and is surmounted by a pediment. The intercolumniations are 5⅔ modules from the axis.

The architects of these two temples, in order that the capital at the angle might offer two similar faces, the one at the front of the edifice, and the other at its side in return, extended the outer volute in a curved line, in such a manner, as to be enabled to execute a volute exactly similar in the elevation in return. This arrangement, which is intended to decrease the degree of irregularity in the form and appearance of the Ionic capital, and which renders its employment so difficult at the return of an angle; is so far overcome as to be much more striking in plan than elevation. The Ionic columns (of which the capitals form so striking a feature) in the small temple, situated near the river Ilissus, may serve to shew the great varieties that the few existing remains of Greece offer in this order, when

compared with the two examples just described; and which may be further illustrated by a comparison of the remains above cited with those of the temple of Apollo Didymæus, near Miletus.

The capitals of the columns of the temple of Apollo, are composed of an abacus sculptured in oves, and a fillet and band forming a straight line; from which spring the volutes, together with a quarter round, decorated with oves, and an astragal with berries. This example presents as great a degree of simplicity as most of those offered in the remains of Greece, if we except the example at Athens, designated by the name of the aqueduct of Adrian; which is of a similar design to the one last mentioned, only that its ornaments are confined to the large quarter-round of its capital, which is sculptured in oves. This example resembles the one mentioned by Vitruvius.

The temple of Manly Fortune, at Rome, now S. Maria Egiziaca, presents a rectangular plan, 58 feet, 1 inch in length, and 30 feet, 7 inches in breadth; situated upon a basement 11 feet, 1 inch, and 6 lines in height. The cornice of this basement is composed of too many small mouldings; its lower part offers a larger style.

The façade, of the flight of steps leading to which only two remain, was composed of a portico, having four columns in front, and two in projection; the third being engaged at the angle of the wall of the cella, which was repeated at the three remaining sides, by ten others that projected half their diameter from the wall.

The ordonnance is Ionic, the columns of which are fluted, having 3 feet, 6 lines in diameter, and 28 feet,

4 inches, and 8 lines in height; comprising their attic base, which is 1 foot, 6 inches, and 2 lines in height, together with that of their capital, being 1 foot 1 inch and 4 lines. The capitals of the columns situated at the angles, have each an angular volute, so as to present at each side of the portico, the same appearance. Many of the modern masters, and amongst others Palladio and Scamozzi, have, under similar circumstances, imitated this disposition.

The intercolumniations are 6 modules, 6½ parts; that of the centre being 7 modules, and 5 parts, from axis to axis.

The height of the entablature is nearly one-fourth of that of the columns. The architrave has three fascias. The frieze is judiciously ornamented with candelabra, festoons, and genii; the situation of the last of these, corresponds to the middle of each column. The relative proportion of the cornice is very great, being three parts more in height than that of the architrave and frieze, when taken together. The ornaments, sculptured on the mouldings of the pediment, are perpendicular in their position. The entablature of this edifice appears massive; yet on further examination, it will be found to express, by the distribution of its mouldings, the particular character of the order to which it belongs. Some of the modern masters have profited from this example, by reducing the height of the cornice, and increasing that of the other two members.

The exterior of the wall of the cella is wrought in rustics. The erection of this edifice takes its date from Servius Tullius, one of the first Roman kings.

The Temple of Concord, situated at the capitol, near

Campo-Vaccino, presents, in its remains, a portico composed of six columns in front, and one in return on each of its sides; with some vestiges of a foundation on its southerly side, being all that is left of this edifice. The precise date of its erection is uncertain, though attributed to Fabius Camillus. From the following inscription: "S. P. Q. R. Incendio consumptum restituit," cut in the architrave and frieze, which present in their entire length one united and uninterrupted surface, it appears to have suffered from fire, and afterwards to have been either wholly or in part rebuilt.

The ordonnance of this temple is Ionic, and the diameter of the columns is 4 feet 5 inches and 6 lines; which is given as a proportional measure, as their dimensions are not uniformly the same. Their height is 42 feet, 8 inches, including the capital and base. The latter is composed of an upper and lower torus, and two intervening scotias in all the columns, except those at the angles, which have the addition of a plinth, the dimensions being equal, by means of a reduction in the upper mouldings of the same. The capital is of a mixed character, partaking in its lower part of the expression of the Doric, and its volutes are angular, and therefore without balusters. The architrave of this temple, which on its right side is profiled, forming three fascias, with astragals similar to that on the corresponding side, under the soffit of the portico, is in projection beyond the superior diameter of the columns, the whole of their diminution. The proportion of the cornice, when compared with the rest of the ordonnance, presents a meagre appearance. The compartments formed in

its soffit, are ornamented with some very fine roses, and the modillions by which they are separated, are placed independently of any correspondence with the columns; indeed the intercolumniations themselves are unequal; that in the centre is 3 modules, 25 parts, for the others the medium proportion is 3 modules, 15 parts. In the construction above the cornice, arches are employed that extend from one column to the other, in order to secure the entablature in the width of the intercolumniations, from being injured by the weight of the pediment.

In the Ionic order, at the theatre of Marcellus, the superior mouldings of the cornice to the lower part of the corona being decayed, the proportions of the part wanting have been supplied in the table of this order; where this part is given, according to the spirit of the rest. Its columns are 18 modules in height, and the entablature 4 modules, 25 parts, and two-thirds; in which the architrave is 1 module, and 13 parts, the frieze 1 module, and 6 parts and two-thirds, and the cornice 2 modules, and 6 parts. The part of the cornice which remains, is well proportioned and profiled; the lower extremities of the fascias retire inwards; the capital of the column is graceful, and in perfect relation with the rest of the order; the base is attic. This example of the Ionic order appears to have served as a model to many modern authors.

The entablature of this order at the Colosseum, is 4 modules, and 16 parts, and the column 17 modules, and 9 parts and a quarter. The whole of this example is without ornaments; and the volutes of its capital are without the ordinary spiral flutings,

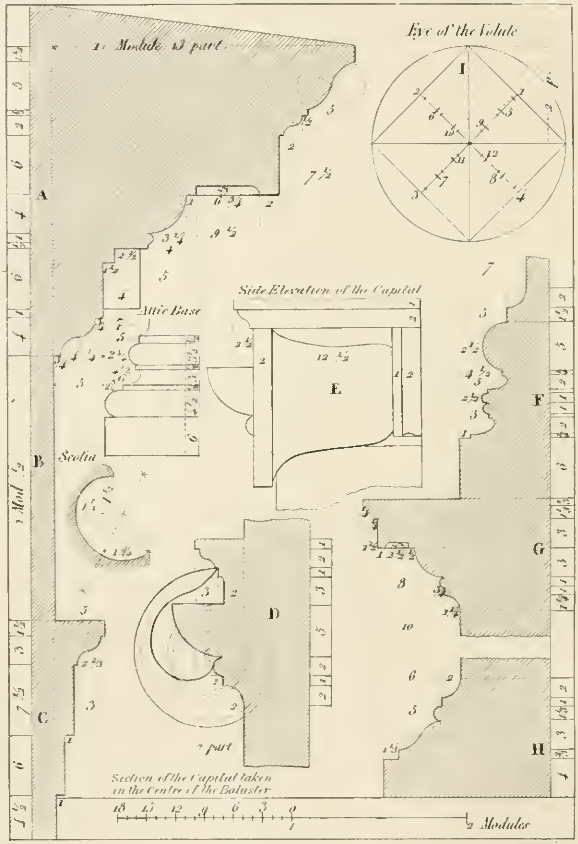
depending entirely on the harmony of its proportions for effect. The base is attic.

The example of this order at the Thermæ of Dioclesian, has its entablature supported by a pilaster, which was doubtless placed in the angle of one of the saloons of this immense edifice, corresponding with columns or pilasters. The entablature is 3 modules and 18 parts in height, and the pilaster 17 modules. Some of the mouldings of the entablature are decorated with sculpture, the quarter round of the pilaster with oves, and its shaft with flutings. Its base is attic. Vignola, in making his researches amongst the antique remains, on meeting with this example, appears to have benefited from its profile, if we may judge from the similarity which exists between this part and that of his Ionic order.

Of the Ionic order, Greece itself offers great variety of expression, as has been just before remarked, and which is proved by comparing the columns, (the capitals of which form so conspicuous a feature in this order,) of the temple on the Ilissus, with those of Minerva Polias and Erectheus, and these latter with those of the temple of Apollo Didymæus, at Miletus. Between the example last-mentioned and that of Fortuna Virilis, at Rome, there exists an almost incomparably less degree of difference, than between that of Apollo, just cited, and of Minerva Polias, both of which are of Greece.

In fine, architecture demands, in the numerous compositions that are intended to exhibit a conformity to modern customs and wants, that the different shades comprehended in the character of each order be applied according as the nature of each edifice may

DETAILS OF THE IONIC ORDER.



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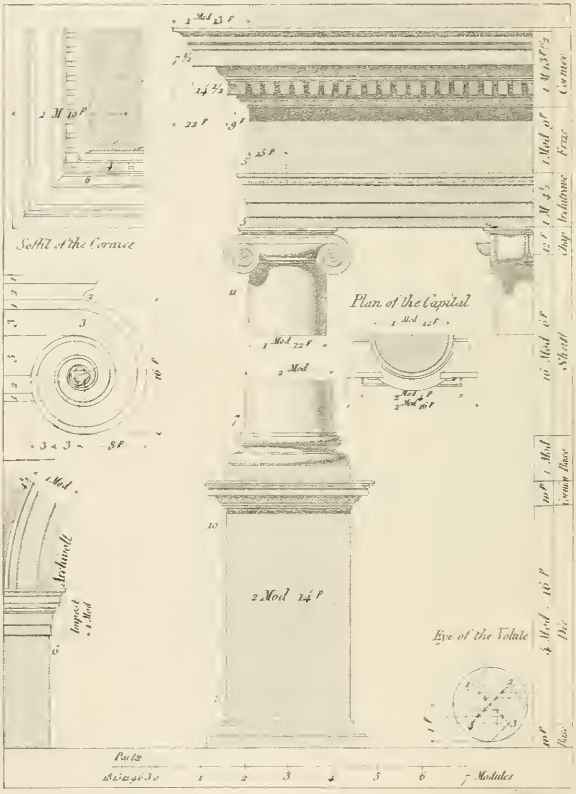
IONIC ORDER.

Pl. 9



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require; and these shades are nothing more than variations in the expression of the special quality which constitutes the prominent feature in each architectural ordonnance. Thus, in the execution of the Corinthian, a degree of simplicity may be given, without losing the characteristics of the order; and so in like manner, a less masculine expression may be given to the Doric, without detriment to its distinguishing features.

OF PILASTERS.

Pilasters, according to their present employment, present nothing more than square pillars, supposed to be engaged in a wall, which may be employed in this state, in the ordonnance of edifices, with as much reason and propriety as columns may, when placed against, or engaged in a massive.

Pilasters may also be considered as a fictitious representation of columns, superseding them in many cases. Some persons have wished to exclude the employment of pilasters in architecture, on the ground that the Grecian edifices which exist do not exhibit this species of ordonnance. On this subject one observation may be made. Few original productions of this part of architecture, as practised in Greece, have descended to us, from which any thing either general or absolute can be concluded on this subject. The works which have been cited as peremptory precedents against the employment of pilasters, are mostly temples of considerable uniformity in their plans and elevations; from which nothing can be determined, except that

the general custom of their ordonnances only admitted of insulated columns.

The antique architecture at Rome, presents many examples of the employment of pilasters. There also exists great diversity, in the numerous structures in which they have been employed. Examples may be cited in which pilasters were used as a decorative ordonnance, without any connexion with columns; whilst in others they have been placed in correspondence with insulated columns; besides a multitude of cases, where the columns of a portico, or a part in advance, have been suitably repeated by corresponding pilasters. When the soffit of an architrave finishes against the face of a wall, who would not approve of it resting upon the capital of a pilaster of the same order, instead of remaining without any apparent support?

With regard to the projection of pilasters, Perrault observes, "that those which present but one face from the wall, should have half of it in projection, or at least a sixth part, when there is no necessity for a greater thickness, as in the frontispiece of Nero."

The pilasters at the exterior of the Pantheon, have but the tenth part of their surface in projection; whilst in other examples the fourteenth part only is given, as was practised in the pilasters of the forum of Nerva.

But when it is intended to profile imposts against their sides, they have one-fourth of their diameter given for projection. This proportion is convenient, because it prevents an irregular diminution of the Corinthian capital; for it then causes the inferior leaf and stem of the capital to be cut exactly in their centre For the same reason, when semi-pilasters are employed

in internal angles, it is essential to their symmetry that they should project more than half their diameter.

The diminution of pilasters is essentially connected with their form. There is on this point a diversity of opinions. "Pilasters," says Perrault, "do not ordinarily diminish, when they present but one face from the wall. Those at the exterior of the portico of the Pantheon, are without diminution. But when pilasters are on the same line with columns, and it is intended to continue the entablature upon each, without break, as at the two sides of the exterior of the Pantheon, it is then necessary to give the same diminution to pilasters as to columns, but to the front face only, leaving the sides without diminution, as is observed at the temple of Antoninus and Faustina. When pilasters, situated at an angle, present two faces from the wall, if one of the faces be opposite a column, this face should be diminished in the same proportion as the column, whereas that which is not opposite, is left undiminished; as at the portico of Septimus Severus. There are, nevertheless, examples in the antique, where pilasters have no diminution, as in the interior of the Pantheon; and others where they have very little, or less than that of the column, as at the temple of Mars the Avenger, and the arch of Constantine. On these occasions it was sometimes the practice of the ancients to place the architrave over the face of the columns, which caused the face of the pilasters to retire inwards. The temple of Mars the Avenger, interior of the Pantheon, and portico of Septimus Severus, present us with examples of this description. At other times they divided it into half, by making the architrave project in false bearing, beyond the face of the column

one half; and retire the other half from the face of the pilaster, as at the forum of Nerva.

When pilasters are employed in ordonnances of columns, they are submitted, as has been shown, to the same forms and proportions. As to flutings, there exists a greater liberty in their application to pilasters; the ancients having left us more than one diversity. Sometimes pilasters with flutings, are found associated with columns without, as at the portico of the Pantheon; which doubtless may be explained by the difference of the materials. The pilaster being of white marble, and the columns of granite; which latter material will not admit of being worked in flutings; its principal worth and merit consisting in its fineness and polish. There are also at other times fluted columns accompanied with pilasters without flutings; examples of which may be seen at the temple of Mars the Avenger, and the portico of Septimus Severus. It may be added, that when pilasters have less projection than half of their diameter, flutings are not practised in the part which is termed *in return.*

If we consult the authority of the antique as to the number of flutings in pilasters, we find nothing determinate. For example, there are seven in the pilasters of the portico of the Pantheon, the arch of Septimus Severus, and that of Constantine. The pilasters in the interior of the Pantheon have nine flutings; although, according to the ordinary practice, columns have but twenty-four. Flutings in pilasters are always employed in an uneven number. If they be semi-pilasters, forming an internal angle, four are placed instead of three and a half; and five instead of four and a half, when the entire pilasters of the same ordonnance have

seven or nine. It is thus arranged, to avoid the bad effect that would otherwise result in adapting the capital to the angle, the centre of which should coincide with it, and without which, an inequality would take place that would prevent the full extension of the capital in its upper members; particularly a capital ornamented with foliage, for, without this arrangement, it could not be sufficiently developed.

The proportion of capitals is the same in pilasters as in columns, as regards the heights; but the breadths are different, and the developments of their forms gives a greater space to each of their faces, because they are quadrangular. In the design (pl. 11) of the Ionic pilaster, the volutes are placed in projection from its face; in like manner as in the column of the same order. In its height, the same proportions and mouldings are observed; the only difference being in the fillet, astragal, and quarter-round. If the projection which this last moulding has beyond the face of the shaft be strictly followed, it would be seven parts; but in this design it is fixed at six, that the curve which it is necessary to give it may be softer, and cut less upon the right lines against which it finishes. But it may have seven parts given to it, by observing that the extremities be brought to the same point; namely, to the superior point of the quarter round, A, at the intersection of the perpendicular to the axis of revolution, at the height of B. The flutings have the same breadth as those of the lower part of the shaft of the column, and the angle of the pilaster may be terminated as shown in the design; or otherwise by increasing the breadth of the flutings, so that the part which is next to the angle be equal to the others. It

may be further observed, that the canal, marked two parts in depth over the horizontal line of the quarter round, (see section) ought to decrease in depth, according as the spiral of the volute approaches towards the eye.

METHOD OF TRACING THE IONIC VOLUTE.

PLATE XII.

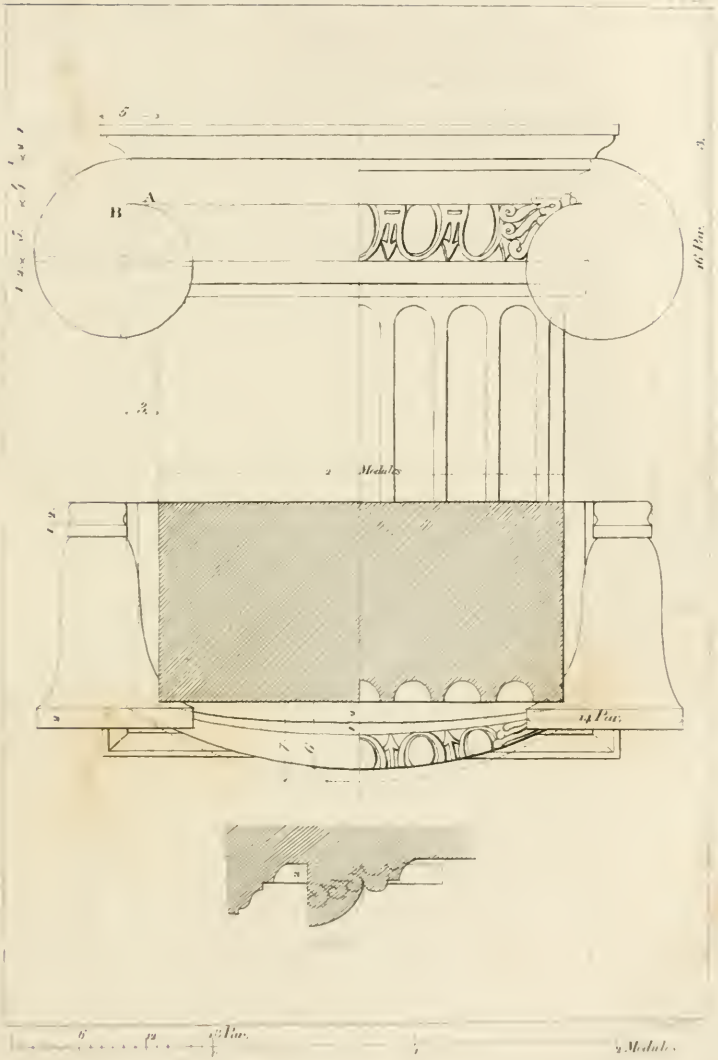
After having drawn the mouldings of the capital, the eye of the volute should be placed upon the horizontal line E, at the intersection of the vertical line D; afterwards from this centre should be drawn a circle, a part of the radius of the vertical diameter of which is named cathètes, and forms the diagonal of a square, the sides of which are divided into two equal parts. From these points should be drawn the subdivisions of the axis, 1, 3, and 2, 4; which are to be divided into six equal parts: these points will be the centres, which serve to describe the exterior contour of the volute.

Placing one point of the compasses on the point 1, and extending the other to D, describe the quarter of the circle DA. Afterwards take the point 2 as a centre; and then in the same order, as fig. 1, pl. 10.

To find the centres for the interior contour of the volute, the divisions which served for the first should be divided into four parts. The first subdivision under each of the former points, will serve as centre for the interior of the spiral fillet.

The total height of the volute is sixteen parts of a module; nine of which are over the horizontal line E, and seven below it. Plate 12.

CAPITAL OF IONIC PILASTER



CORINTHIAN ORDER OF VIGNOLA,

THE NAMES AND DETAILED PROPORTIONS OF THE MEMBERS AND MOULDINGS OF WHICH THE ORDER IS COMPOSED.

PLATES 12, 13, 14, 15, 20, and 21.

	ENTABLATURE.	Heights.			Projections from axis of Columns.		
		Modules.	Parts or Minutes	Fractions.	Modules.	Parts or Minutes.	Fractions.
Entablature 5 modules.	**A. CORNICE.**						
	Fillet	..	1	..	2	17	..
	Cyma Recta	..	5	..	2	17	..
	Fillet	..	....	½	2	12	..
	Cyma Talon	..	1	½	2	11	½
	Corona	..	5	..	2	10	..
	Cyma Talon	..	1	½	{2 {1	9 11	½ ½
	Modillion	..	6	..	2	8	½
	Rest of Band behind Modillions	..	....	½	1	10	½
	Quarter Round	..	4	..	1	10	..
	Astragal	..	1	..	1	7	..
	Fillet	..	....	½	1	6	½
	Dentils	..	6	..	1	6	..
	* String of Dentils	..	1	½	1	5	..
	Rest of Band behind Dentils	..	....	½	1	2	..
	Cyma Talon	..	3	..	1	1	⅔
		2	-	-			
	B FRIEZE.						
	Astragal	..	1	..	....	16	¾
	Fillet	..	....	½	....	16	¼
	Conge	..	1	¼	....	15	..
	Frieze	1	6	¼	. .	15	..
		1	9	-			
	C. ARCHITRAVE.						
	Fillet	..	1	..	1	2	..
	Cyma Talon	..	4	..	1	1	⅔
	Astragal	..	1	..	....	17	..
	First Fascia	..	7	..	....	16	½
	Cyma Talon	..	2	..	....	16	⅓
	Second Fascia	..	6	..	....	15	½
	Astragal	..	1	..	....	15	½
	Third Fascia	..	5	..	....	15	..
		1	9	-			

* The height of the string of dentils is taken in that of the dentils.

The flutings of the shaft of the column of this order are separated by a fillet.

	COLUMN AND PEDESTAL.	Heights.			Projections from axis of Columns.		
		Modules.	Parts or Minutes.	Fractions.	Modules.	Parts or Minutes.	Fractions.
Column 20 modules.	**CAPITAL.**						
	Capital (*For Details see Plates* 13, 15, & 20)	2	6	..	1	9	..
		2	6	-			
	SHAFT.						
	Astragal	..	2	..	1	....	..
	Fillet	..	1	..	....	17	..
	Conge	..	2	..	....	15	..
	Shaft between Conges	16	3	½	{.. {1	15	.. ..
	Conge	..	2	..	1	....	..
	Fillet	..	1	½	1	2	..
		16	12	-			
	E. BASE.						
	Torus	..	3	..	1	4	..
	Fillet	..	....	¼	1	2	½
	Scotia	..	1	½	1	2	..
	Fillet	..	....	¼	1	3	⅝
	Two Astragals	..	1	..	1	4	..
	Fillet	..	....	¼	1	3	⅝
	Scotia	..	1	½	1	3	⅙
	Fillet	..	....	¼	1	5	..
	Torus	..	4	..	1	7	..
	Plinth	..	6	..	1	7	..
		1	-	-			
Pedestal 6 mod. 12 parts.	**F. CORNICE.**						
	Fillet	..	....	⅔	1	15	½
	Cyma Talon	..	1	⅓	1	15	¼
	Corona	..	3	..	1	14	..
	Gorge	..	1	¼	1	12	⅔
	Astragal	..	1	..	1	8	½
	Fillet	..	....	¾	1	7	⅔
	Frieze	..	5	..	1	7	..
	Astragal	..	1	¼	1	8	⅞
		-	14	¼			
	DIE.						
	Fillet	..	....	¾	1	8	¼
	Conge	..	1	¼	1	7	..
	Die	4	15	¼	1	7	..
	Conge	..	1	½	1	7	..
	Fillet	..	....	¾	1	8	½
		5	1	½			
	G. BASE.						
	Astragal	..	1	¼	1	9	¼
	Cyma Reversa	..	3	..	1	8	⅚
	Fillet	..	1	..	1	12	⅔
	Torus	..	3	..	1	14	½
	Plinth	..	6	..	1	14	½
		-	14	¼			
	Total	31	12	-			

☞ The module employed in this Table is divided into eighteen parts

A COMPARATIVE TABLE OF THE GENERAL PROPORTIONS OF THE CORINTHIAN ORDER.

FROM THE MOST CELEBRATED EDIFICES OF ANTIQUITY.

TOGETHER WITH THOSE ASSIGNED TO IT BY THE MOST EMINENT MODERN MASTERS.

Each cell gives Modules, Parts, Fractions.

	Choragic Monument of Lysicrates.		An antique Edifice at Salonica.		Arch of Theseus, at Athens.		Portico surrounding the Temple of Jupiter Olympus at Athens.	
	Height of the Members.	Projection from the axis of the Columns.	Height of the Members.	Projection from the axis of the Columns.	Height of the Members.	Projection from the axis of the Columns.	Height of the Members.	Projection from the axis of the Columns.
Entablature: Cornice	1 20 ..	2 15	1 13 ½	2 4 ½	1 16 ½	2 21	1 18 ..	2 19
Frieze	1 9 ½	.. 29 ¼	1 12 ½	1 2	1 10 ..	1 9 ½	.. 27 ½	1 2 ½
Architrave	1 21 ..	1 3 ¾	1 16 ½	1 3 ½	1 12 ½	1 8 ½	1 11 ½	1 9 ½
	4 20 ½	-	4 12 ½	-	4 9	-	3 27 -	-
Column: Capital	2 23 ..	1 17	2 11 .	1 23	2 1	1 [illegible] ½	2 7	1 25
Shaft	16 16 .	.. 25 1 ..	14 28	.. 25 ½ 1 ..	15 3	.. 27 ½ 1	16 7	.. 26 ½ 1 ..
Base	.. 21 ..	1 15	1 6 ..	1 15 ½	1 10	1 [illegible] ½	1 1 .	1 12 ..
	20 - -	-	18 15 -	-	19 - -	-	19 15 -	-
Height of the Column and Entablature	24 20 ½	-	22 27 ½	-	23 9 -	-	23 12 -	-
Pedestal: Cornice	..	..	.. 16	1 18 ½	.. 15 ½	1 [illegible] ½	.. 12 ½	1 13 .
Die	..	..	1 3 ½	1 13 ½	3 3	1 12 ½	1 2	1 5 ½
Base	..	..	.. 13	1 18 ½	.. 20 ½	1 19 ½	.. 15 ½	1 14 ½
	-	-	2 2 ½	-	4 8 ½	-	*2 .. ½	-
	Height of members.	From face of Arcades.	Height of members.	From face of Arcades.	Height of members.	From face of Arcades.	Height of members.	From face of Arcades.
Impost	..	..	..	..	..	..	..	..
Archivolt	..	..	..	..	..	..	..	..
Key of Arcades without Pedestals	..	..	..	..	..	..	..	..
Key of Arcades with Pedestals	..	..	..	..	..	..	..	..
	Height.	Width.	Height	Width.	Height	Width.	Height	Width.
Intercolumniations, from axis to axis	..	6 6 .	..	8 24 ..	..	..	..	8 ..
Columns of Arcades without Pedestals, from axis to axis	..	..	..	..	..	..	..	..
Apertures of Arcades without Pedestals	..	..	..	..	..	..	..	..
Columns of Arcades with Pedestals, from axis to axis	..	..	..	..	..	..	..	..
Apertures of Arcades with Pedestals	..	..	..	..	..	..	..	..

	Temple of Jupiter Stator, at Rome.		Temple of Mars the Avenger, at Rome.		Temple of Jupiter Tonans, at Rome.		Interior of the Pantheon, at Rome.	
	Height of the Members.	Projection from the axis of the Columns.	Height of the Members.	Projection from the axis of the Columns.	Height of the Members.	Projection from the axis of the Columns.	Height of the Members.	Projection from the axis of the Columns.
Entablature: Cornice	2 9 ½	3 3 ½	..	..	1 16 ½	2 13	1 21 ½	2 16 .
Frieze	1 13 ½	.. 20 ½	..	.. 26 ½	1 13 ..	.. 26	1 12 ..	.. 25 ½
Architrave	1 13 ½	1 3 ½	1 9 ½	1 5 ..	1 8 ½	1 4 ½	1 12 ..	1 3 ½
	5 6 ½	-	-	-	4 7 ½	-	4 15 ½	-
Column: Capital	2 6 ½	1 14	2 9 ½	1 16 ..	2 10	1 14 ½	2 8 ½	1 15 ..
Shaft	17 ..	.. 25 ½ 1	..	.. 25 ½ 1 ..	17 4 ½	.. 26 .. 1 ..	15 26	.. 26 .. 1 ..
Base	1 ..	1 12 .	..	..	1 .. ½	1 11 ½	1 ..	1 11 ..
	20 6 ½	-	-	-	20 15 .	-	19 4 ½	-
Height of the Column and Entablature	25 12 ½	-	-	-	24 22 ½	-	23 19 ½	-
Pedestal: Cornice	..	..	..	..	..	..	..	..
Die	..	..	..	..	..	..	..	..
Base	..	..	..	..	..	..	..	..
	-	-	-	-	-	-	-	-
	Height of members.	From face of Arcades.	Height of members.	From face of Arcades.	Height of members.	From face of Arcades.	Height of members.	From face of Arcades.
Impost	..	..	..	..	..	..	..	..
Archivolt	..	..	..	..	..	..	..	..
Key of Arcades without Pedestals	..	..	..	..	..	..	..	..
Key of Arcades with Pedestals	..	..	..	..	..	..	..	..
	Height	Width.	Height.	Width.	Height	Width.	Height.	Width.
Intercolumniations, from axis to axis	..	5 6 ..	..	4 28 ½	..	5 3 ½	..	6 10 ..
Columns of Arcades without Pedestals, from axis to axis	..	..	..	..	..	..	..	..
Apertures of Arcades without Pedestals	..	..	..	..	..	..	..	..
Columns of Arcades with Pedestals, from axis to axis	..	..	..	..	..	..	..	..
Apertures of Arcades with Pedestals	..	..	..	..	..	..	..	..

	Portico of the Pantheon, at Rome.		Frontispiece of Nero, at Rome.		* Forum of Nerva, at Rome.		Temple of Antoninus and Faustina, at Rome.	
	Height of the Members.	Projection from the axis of the Columns.	Height of the Members.	Projection from the axis of the Columns.	Height of the Members.	Projection from the axis of the Columns.	Height of the Members.	Projection from the axis of the Columns.
Entablature: Cornice	1 24 ..	2 18 ½	1 27 ½	2 22 .	1 25 ½	2 23 ..	.. 22 ½	2 17 ½
Frieze	1 9 ½	.. 26 ½	1 14 ½	.. 24 ..	1 15 ..	.. 27 ..	1 10 ½	.. 25 ½
Architrave	1 12 ½	1 4 ½	1 14 ½	1 5 ½	1 14 ..	1 5 ½	1 13 ½	1 3 ..
	4 16 ½	-	4 26 ½	-	4 24 ½	-	4 10 ½	-
Column: Capital	2 7 ½	1 15 ½	2 16 ..	1 17 ..	2 12 ½	1 15 ..	2 8 ½	1 14 ½
Shaft	16 8 ½	.. 26 ½ 1 ..	16 10 ½	.. 26 ½ 1 ..	..	.. 26 .. 1	15 28 ..	.. 26 ½ 1 ..
Base	1 . ..	1 12 ..	1 3 ½	1 12 ..	..	..	.. 29 ½	1 12 ..
	19 16 ½	-	20 - -	-	-	-	19 6 ½	-
Height of the Column and Entablature	24 2 ½	-	24 26 ½	-	-	-	23 23 -	-
Pedestal: Cornice	..	..	..	..	..	..	..	..
Die	..	..	..	..	..	..	..	..
Base	..	..	..	..	..	..	..	..
	-	-	-	-	-	-	-	-
	Height of members.	From face of Arcades.	Height of members.	From face of Arcades.	Height of members.	From face of Arcades.	Height of members.	From face of Arcades.
Impost	..	..	..	..	..	..	..	..
Archivolt	..	..	..	..	..	..	..	..
Key of Arcades without Pedestals	..	..	..	..	..	..	..	..
Key of Arcades with Pedestals	..	..	..	..	..	..	..	..
	Height.	Width.	Height	Width.	Height.	Width.	Height	Width.
Intercolumniations, from axis to axis	..	6 22 ½	..	5	..	12 27 ..	..	5 1 .. 5 12 ½
Columns of Arcades without Pedestals, from axis to axis	..	..	..	..	..	..	..	..
Apertures of Arcades without Pedestals	..	..	..	..	..	..	..	..
Columns of Arcades with Pedestals, from axis to axis	..	..	..	..	..	..	..	..
Apertures of Arcades with Pedestals	..	..	..	..	..	..	..	..

	Basilica of Antoninus, at Rome.		Arch of Constantine, at Rome.		PALLADIO.		SCAMOZZI.	
	Height of the Members.	Projection from the axis of the Columns.	Height of the Members.	Projection from the axis of the Columns.	Height of the Members.	Projection from the axis of the Columns.	Height of the Members.	Projection from the axis of the Columns.
Entablature: Cornice	..	..	1 28 ½	2 23 ..	1 17 ½	2 14 ..	1 19 ..	2 15 ..
Frieze	1 2 ½	.. 27 ..	1 10 ..	.. 26 ½	.. 28 ½	.. 26 ..	1 2 ..	.. 26 ..
Architrave	1 13 ½	1 6 ½	1 15 ..	1 3 ½	1 8 ..	1 4 ½	1 10 ..	1 4 ½
	-	-	4 23 ½	-	3 24 -	-	4 1 -	-
Column: Capital	2 9 ½	1 16 ½	2 5 ½	1 14 ½	2 10 ..	1 15 ..	2 16 ..	1 15 ..
Shaft	17 .. ½	.. 26 ½ 1 ..	15 24 ½	.. 26 ½ 1 ..	15 20 ..	.. 26 .. 1 ..	16 20 ..	.. 26 .. 1 ..
Base	1 1 ½	1 11 ½	1 6 ½	1 12 ..	1 ..	1 12 ..	1 ..	1 10 ..
	20 11 ½	-	19 7 .	-	19 - .	-	20 - .	-
Height of the Column and Entablature	-	-	24 . ½	-	22 24 -	-	24 1 .	-
Pedestal: Cornice	..	..	.. 29 ½	2 1 ½	.. 18 ½	1 27 ..	.. 23 ½	1 27 ..
Die	..	..	5 2 ..	1 12 ½	8 14 ½	1 12 ..	4 6 ..	1 10 ..
Base	..	..	1 16 ½	2 1 ½	1 8 ..	1 27 ..	1 19 ..	1 25 ..
	-	-	7 18 .	-	10 11 .	-	6 20 ½	-
	Height of members.	From face of Arcades.	Height of members.	From face of Arcades.	Height of members.	From face of Arcades.	Height of members.	From face of Arcades.
Impost	..	..	1 1 ½ 1 9 ½	.. 15 ½ 1 10 ..	1 1 ½	.. 15 ..	1 6 ..	.. 20 ½
Archivolt	..	..	1 3 . 1 7 ½	.. 9 .. .. 5 ..	.. 27 ..	.. 9 ..	.. 25 ..	.. 5 ½
Key of Arcades without Pedestals	..	..	..	..	..	..	1 20 ..	..
Key of Arcades with Pedestals	..	..	1 5 ½ 1 22 ½	..	1 20 ..	..	2	..
	Height	Width.	Height	Width.	Height.	Width.	Height	Width.
Intercolumniations, from axis to axis	..	5 10 ½	..	..	1 20 ..	6	..	6 6
Columns of Arcades without Pedestals, from axis to axis	..	..	..	..	..	..	21	12 .. ..
Apertures of Arcades without Pedestals	..	..	..	..	..	..	19 10 ..	8 8 ..
Columns of Arcades with Pedestals, from axis to axis	..	..	†28 22 ½	14 5 .. 21 9 ½	..	13	..	12 .. ..
Apertures of Arcades with Pedestals	..	..	16 15 .. 26 25 ½	7 18 ½ 14 23 ½	22 10 ..	9 6	24 20 ½	10 .. ..

	SERLIO.		ALBERTI.		VIGNOLA.	
	Height of the Members.	Projection from the axis of the Columns.	Height of the Members.	Projection from the axis of the Columns.	Height of the Members.	Projection from the axis of the Columns.
Entablature: Cornice	1 9 ..	2 11 ..	1 10 ..	2 10 ..	2	2 28 ½
Frieze	1 7 ..	.. 26 ..	1	.. 26 ..	1 15 ..	.. 25 ..
Architrave	1	1 3 ..	1	1 2 ..	1 15 ..	1 3 ½
	3 16 -	-	3 10 .	-	5 - .	-
Column: Capital	2	1 11 ..	2	1 11 ..	2 10 ..	1 15 .
Shaft	15	.. 26 .. 1 ..	15	.. 26 .. 1 ..	16 20 ..	.. 25 1 ..
Base	1	1 12 ½	1	1 11 ..	1	1 11 ½
	18 . .	-	18 - -	-	20 - .	-
Height of the Column and Entablature	21 16 .	-	21 10 .	-	25 - -	-
Pedestal: Cornice	..	..	..	..	.. 23 ½	1 24 ½
Die	..	..	..	..	5 6 ½	1 11 ½
Base	..	..	..	..	.. 20 ..	1 24 ½
	-	-	-	-	6 20 .	-
	Height of members.	From face of Arcades.	Height of members.	From face of Arcades.	Height of members.	From face of Arcades.
Impost	..	..	..	..	1	.. 10 ..
Archivolt	..	..	..	..	1	.. 8 ..
Key of Arcades without Pedestals	..	..	..	..	2	..
Key of Arcades with Pedestals	..	..	..	..	2	..
	Height.	Width.	Height.	Width.	Height	Width.
Intercolumniations, from axis to axis	..	..	..	..	..	6 20 ..
Columns of Arcades without Pedestals, from axis to axis	..	..	..	..	..	12 ..
Apertures of Arcades without Pedestals	..	..	..	..	18	9 ..
Columns of Arcades with Pedestals, from axis to axis	..	..	..	..	..	16 ..
Apertures of Arcades with Pedestals	..	..	..	..	24 20 .	12 ..

The projection of the capitals is taken to the centre of a line drawn from each extremity of the abacus.

* There is a socle under the base of the pedestal, 1 module and 6½ parts in height, and 1 module and 20½ parts in projection from the axis of the column.

† There is also a socle between the plinth of the base of the column and the cornice of the pedestal of the Arch of Constantine, which is 18½ parts in height, and 1 module and 12½ parts in projection; and another under the plinth of the base of the pedestal, 1 module and 9 parts in height, and 2 modules and 3½ parts in projection.

☞ The module employed in this table is divided into thirty parts.

THE CORINTHIAN ORDER.

It has already been remarked, that all the orders take their origin from the Doric ;—that the Ionic itself is but a richer and more varied composition of this first order ; and it will not be difficult to prove the same assertion with regard to the Corinthian, which is the subject of this article.

The circumstance of the basket covered with a flag, which was placed upon the tomb of a young maiden ; and the fortunate chance which occasioned the composition of the capital known by the name of Corinthian, has been treated as a fable by many writers. But in the Corinthian capital two things must be distinguished which are greatly different, and very independent of each other ; namely, its form and decoration. As to its form, it is certain that the Corinthian existed a long time before Callimachus, its supposed inventor ; and it is the opinion of some, that the idea of its form and decoration, has been imitated from the capitals of the Egyptians ; which were surrounded with leaves and sacred plants. On the supposition, however, of the truth of the circumstance above alluded to, it is not improbable that Callimachus, on seeing the effect of the plant on the sides of the basket, derived from thence the idea of substituting the acanthus for the other plants or leaves which had been employed previous to his time ; and the accidental arrangement of this acanthus might also

have suggested that order and disposition of the leaves, which custom has since established as a law for this capital. Nevertheless, the great variety observed in the decoration of the Corinthian capital amongst the ancients, sufficiently proves, that its form or type was always independent of the accessory ornaments, that religion, allegory, and the taste of the sculptors, caused to be applied in so many different ways.

Amongst the antique edifices that time has spared at Athens, the two most remarkable are the tower of the Winds, and the small monument commonly called the Choragic momument of Lysicrates. The capitals of the tower of the Winds are very different, in the arrangement which their foliage offers, to that agreed upon to distinguish the Corinthian capital. The general form of the capital is well expressed, and is ornamented with one range of olive and another of water-plant leaves. Neither volutes, cauliculi, nor roses, are to be found. The capital of the Choragic monument has volutes, it is true, but not resembling the ordinary composition of the Corinthian capital. The first, or lower range, is, water-plant leaves ; there is no astragal ; and nothing of the acanthus appears in its decoration.

These two examples are sufficient to prove, how much the decoration of the capital was at this time arbitary, although its form was always the same.

If the primitive state of the order be examined, does not it appear that the only invention for which Callimachus is entitled to credit, is, that of having substituted acanthus leaves for those of the olive or others? He certainly did not invent the form of the vase, nor

the manner of decorating it with foliage: since, in the remains of different edifices, there are examples preserved, where this form exists without foliage; and others where the foliage is not of the acanthus. It would be contrary to the ordinary progress of invention, to suppose that the most complex forms of decoration should precede the simplest, or that the perfecting of this capital has consisted in diminishing the richness of its decoration. What is related of Callimachus, in the discovery of this capital, proves, that its form, and the custom of ornamenting it with foliage, already existed at the time that he by chance saw this basket covered with a tile; under the edges of which were bent the leaves of the acanthus. It is indeed improbable, that in a country where no capital of this kind had ever existed, that the feeble indication just spoken of, could have given rise to the conception and composition of the Corinthian capital. The human mind does not thus effect its discoveries. On the contrary, it may be presumed that Callimachus was already acquainted with, and habituated to, the form of a vase as a capital; and as it was the usage to surround it with ornaments of foliage, he, on meeting accidentally with the basket surrounded by acanthus leaves, might indeed be struck with the analogy between it and a capital ornamented with other leaves. From the descriptions and dates of the edifices of this order, sufficient may be deduced to convince us, in what the discovery of Callimachus consisted.

The different accounts concerning this architect, do not agree as to the period at which he lived; but there can be little doubt that it was before the ninety-fifth Olympiad; for at this epoch, Pausanias places

the construction of a temple by Scopas; in which, over the first range of columns, a second was placed, of the Corinthian order. It is not, however, in Greece, but at Rome, that we must look for the most beautiful models of the Corinthian order.

The temple of Jupiter Tonans is the first that shall be described; it is situated near the capitol, and is said to have been erected in fulfilment of a vow, made by Augustus on his return from Spain; from the circumstance of the electric fluid having struck one of his attendants dead by his side. It appears to have been afterwards either rebuilt or repaired, from the word—*estituer*, which is inscribed upon the remaining fragment of the architrave and frieze.

Of this majestic edifice, there remains but three columns with their entablature of the Corinthian order; forming in their plan a right angle. Their diameter is 4 feet, 7 inches, and two lines, and their height 47 feet, 1 inch, and 5 lines; which includes the base and capital. The base, like the generality of those applied to the Corinthian order, is composed of an upper and lower torus, two astragals, and two scotias, together with fillets, employed in the usual manner. The capital, and above all, its upper part, presents the greatest elegance; but it may perhaps be observed, that the disposition of the leaves with which it is decorated, inclines too much in an outward direction. The volutes at the angles rise a little higher than the under side of the abacus. The proportion of the entablature is between one-fourth and three-quarters, to one-fifth part of the height of the columns. The architrave and frieze, at the front, present an even face, surrounded by a moulding; the

extent of which finishes perpendicularly over the centre of the last column, at the angle of the façade, serving as the place for an inscription. The rest of the architrave at the front, as also that at the side, offers three fascias with mouldings; which latter are richly sculptured; the ornaments wrought on its soffit, both as regards design and execution, are exquisite.

Upon the frieze on the side, are sculptured heads of animals, as well as the instruments used in sacrifices; the whole is arranged with the greatest taste.

All the mouldings of which the cornice is composed, are sculptured in ornaments; they are even applied to the corona and the modillion band. The corona is finished by a small cyma talon and fillet; without having the ordinary crowning moulding, the cyma recta; which makes it more than probable that it was surmounted by a pediment. There is no correspondence either between the ornaments or modillions, with which this cornice is decorated, and the middle of the columns. The intercolumniation at the front is 5 modules, 3 and a half parts, from axis to axis; that at the side is rather less. In fine, the whole of this ordonnance presents an example of the highest degree of richness that it is possible for architecture to assume.

The temple known by the name of Jupiter Stator, though it is probably that of Castor and Pollux, is situated in the forum at Campo Vaccino; which, according to the tradition preserved, was erected by Romulus, and dedicated by him to Jupiter, in commemoration of his having, on the spot occupied by its site, arrested the incursions made by the Sabines. Of this edifice, there remain but three insulated columns, bearing a fragment of their entablature, which are of

the Corinthian order. Whatever credit be attached to the tradition, both the design and execution, most indubitably prove that the present remains are of the Augustan age.

The diameter of these columns is 4 feet, 9 inches, and 4 lines; and their height, including the base and capital, is 48 feet, 3 inches. The base resembles that of the preceding example. The form and proportion of this capital are of the most elegant description, and present in the execution of its foliage, volutes and interlaced helixes; a decided masterpiece of art, both as regards finish and effect. The height of the entablature is rather more than one-fourth of that of the columns. The architrave is divided into three fascias; the second of which is decorated with light ornaments, which it is desirable should be plain. The cornice is of large division, and the ornaments, modillions, and dentils, regularly correspond to each other, and to the middle of the columns; being the only antique example, where this degree of exactness is observed.

The whole of this ordonnance presents a noble and imposing character.

The Temple of Mars the Avenger, erected by order of Augustus, in memory of his victory over Brutus and Cassius, the remains of which are situated at the Foro Transitorio, consists of three columns, a pilaster, and a semi-pilaster, forming a portion of its portico; all that remains of its entablature being the architrave and a fragment of the frieze. This edifice was of the Corinthian order. There still exist some vestiges of the wall of its cella, together with that of the forum of which it formed a part.

The diameter of the columns is 5 feet 9 inches and 4 lines. The foliage of their capitals is composed of olive leaves, that have but little projection, which serves to increase the apparent projection of the abacus; and the principal contours of this foliage are subdivided into few divisions. The total of this capital presents a largeness of design, added to an elegant simplicity in its composition, which makes it a valuable model of its kind.

The architrave, the soffit of which, as also the compartments under the portico, are sculptured in beautiful ornaments; it is formed of three fascias, the divisions of which are marked by suitable mouldings; the inferior part of each fascia is inclined inwards, and the frieze is plain. The intercolumniations are 4 modules, 28 and a half parts, from axis to axis.

The small circular edifice known by the name of the Temple of Vesta, situated near the Tiber, has the wall of its cella round in its plans, as also is that of the peristyle of columns with which it is surrounded. These columns are twenty in number, and of the Corinthian order; having 3 feet, 11 lines, in diameter, and 21 modules in height; comprising their base and capital.

Their base is attic, without plinth, placed upon a continued socle, below which it is probable there might have been others, forming a flight of steps around the whole.

The capitals are decorated with olive leaves, the lower range of which exceeds in height those of the second range. The abacus also, instead of being profiled at its angles, in the ordinary manner, presents an acute angle. There exists no remains of the entabla-

ture. The intercolumniation of these columns is 5 modules from axis to axis. The height of the wall of the cella is divided by a small cornice, having below it a die and base; thus forming a kind of stylobate, 7 modules in height. The remaining portion of the wall is wrought in rustics; and its thickness is 1 module and 14 parts.

The diameter of the cella is 18 modules; and the aperture of the door is 4 modules and 28 parts; the head or horizontal part of which, instead of following the curve of the wall, is straight; by which any appearance of false bearing is avoided.

Although there remains no indication of the covering of this small construction, the wall of the cella being destroyed considerably below the height of the columns; yet there can be little doubt, but that it was terminated by an hemispherical arch. The remains of the temple of Antoninus and Faustina, in the Via Sacra, now S. Lorenzo in Miranda, presents a portion of the lateral walls of its cella, which are wrought in rustics; and a façade, formed of a range of six Corinthian columns; having at the return on each side, two other columns; giving to the peristyle three intercolumniations in projection, together with a corresponding pilaster at each angle of the wall. The diameter of the columns is exactly 4 feet, 10 inches, and 8 lines: and their height, including their capital and attic base, is 46 feet, 11 inches, and 8 lines. The intercolumniation of the two columns at the centre of the peristyle, is 5 modules, 12$\frac{2}{3}$ parts; the others are 5 modules, 1 part, taken from axis to axis. The entablature, which is rather less in height than one-fourth of that

of the columns, has its architrave composed of two fascias: a portion of which, in the centre of the façade, is left undivided, bearing the latter part of the following inscription, the rest being immediately above, upon the frieze: "Divo Antonino, et divæ Faustinæ ex S. C." The beauty of the frieze, which is decorated in a large style with griffins, candelabra, and foliage, is seen to the greatest advantage at the side of the temple; as also is the whole of the entablature; being uninterrupted, and offering one continued line. The cornice of this example, unlike the generality of others of the same order, presents under its corona, which is of a large proportion, neither modillions nor dentils; but a bold quarter round, sculptured in oves; below which are other mouldings. The capital of this example may be classed amongst the best models of its kind.

At the front of this temple was an inclosed area, the centre of which was embellished with the bronze equestrian statue of Marcus Aurelius; now at the capitol.

The Forum of Nerva was also of this order. This forum was inclosed or terminated by a wall decorated with an ordonnance of columns, surmounted with statues; a temple occupying one extremity, and a colossal figure the centre of the area; there rest only two fluted columns with their entablature and attic, the shafts of which are buried half their height. This fragment formed a portion of the innclosure just mentioned. The diameter of these columns is 3 feet, 5 inches, and 10 lines, and they project from the face of their corresponding pilasters, situated against the wall, of which the capital of one alone remains, 3

modules, 23½ parts, taken to the axis of the columns. The intercolumniation of the two columns, the entablature and attic being profiled over each, is 12 modules, 27 parts, from axis to axis.

The architrave is composed of three fascias, the mouldings of each being delicately sculptured, and the frieze is decorated with figures in basso-rilievo, representing Minerva superintending the manufacture of different articles. The cornice is very richly ornamented; and the modillions, oves, and dentils, of which its lower parts are composed, offer no exact correspondence, either to each other, or to the centre of the columns; the capitals of which produce a most admirable effect, and the modinature of the entablature strongly resembles that of the portico of the Pantheon.

In the centre of the attic is a quadrangular niche, containing a statue of Pallas; and the cornice of this attic presents dentils in the place of a corona.

When such beauty is exhibited in the inclosure of these edifices, what must their principal parts have presented?

The next example is, the remains of what is generally named the Basilica of Antoninus, the accuracy of which denomination is however very doubtful; consisting of eleven Corinthian columns, supporting a portion of their entablature; and which now form a part of the Custom-house at Rome.

The diameter of these columns is 4 feet, 9 inches, and 6 lines, and their height, including their attic, base, and capital, is 48 feet, 8 inches, and 7 lines. The lower extremity of the shafts of the columns is terminated by an astragal, which is situated imme-

diately upon the upper torus of the base; and the capital is distinguished by the smallness of its volutes, which project considerably beyond the lower part of the abacus; as also by the inclined position of the leaves that decorate its sides.

The architrave at the exterior is composed of two fascias; in the interior it has three; the superior part of each of which, projects beyond the lower; perhaps with the intention of preserving their real dimensions to the eye of the spectator; as they could only be seen under a very acute angle.

The frieze, with the exception of a small portion at its upper and lower extremities, is curved; it was doubtless left in that state, to receive the labours of the sculptor; hence, the ignorant and unmeaning adoption of a curved frieze in modern architecture.

A few of the inferior mouldings of the cornice still remain; the rest have been destroyed.

These columns are situated upon two socles; the upper part of the superior one, which is two-thirds of a module in height, is equal with the pavement of the edifice. The intercolumniation is 5 modules, 10¼ parts.

Many other examples might be enumerated of this order, presented in the antique remains of Rome; for the general proportions of which the reader is referred to the Comparative Table of the Corinthian order.

"The Corinthian capital," says Perrault, "differs in every respect from those of the two other orders; for it has neither abacus nor echinus; which are the essential parts, and are common both to the Doric and Ionic. It has indeed an abacus, but it is totally different from the others, its four faces forming segments

of a circle, having a rose in the centre of each, and each face inclining inwards from its upper to its lower edge. In the place of echinus and fillets it has but the edge of a vase; the body of which occupies the part of the collarin, and is of a considerable height; being decorated with a double range of eight leaves, the upper extremities of which are bent outwardly. Between these leaves issue stalks, from whence spring the volutes, which have no resemblance, either in form or number, to those of the Ionic capital; being in the Ionic, four, and in the Corinthian, sixteen.

One diameter and a sixth is given for the height of the capital. This height is divided into seven parts, four of which are given for the height of the leaves, namely, two parts to the first range, and the same to the second. The height of each leaf is divided into three, the highest of which is given for the descent of its curve. The three parts which remain of the seven are for the stalks, volutes, and abacus. These parts are again subdivided into seven others; the uppermost two of which are given to the abacus, the three next to the volute, and the two last to the stalks or cauliculi; one of which is given for the descent of the curve of its leaves. Under the angles of the abacus, where the volutes join, there is a small acanthus leaf, between the volutes and the abacus; which inclines towards the angles of the latter, so as to fill the vacancy that there would otherwise be between the volute which descends, and the underside of the abacus, which remains horizontal.

The proportions of this capital, as found in the remains of antiquity, differ from many of those presented in the works of different architects. In the

former, the height of the capital is sometimes lower by a seventh part; being but the diameter of the column as is seen at the temple of the Sibilla, at Tivoli, which accords with that given by Vitruvius. Sometimes it is higher, as in the temple of Vesta, at Rome, and at the frontispiece of Nero, where it is nearly two-sixths more than the diameter of the column, whilst at other times they are found of the height which is here given; as at the portico of Septimus, and at the temple of Jupiter Tonans. At others it is somewhat less, as at the Pantheon, the three columns of Campo Vaccino, at the temples of Faustina and of Mars the Avenger, at the portico of Septimus, and at the arch of Constantine. There are other examples where it is higher, as at the Thermæ of Dioclesian. The moderns also differ in their opinions on this point; for some have made it the height which is here given, as Vignola, Palladio, Scamozzi, Viola, and De Lorm; whilst others, such as Bullant, Alberti, Cataneo, Barbaro, and Serlio, have made them low, after the manner of Vitruvius.

The abacus, in Vitruvius, as also in the three columns of Campo Vaccino, and at the temple of Faustina, is the seventh part of the height of the capital. It is sometimes less, having but an eighth part, as at the Pantheon, at the Basilica of Antonius, and at the Market of Nerva. In others, it has from a fifth to a sixth, as at the temple of Vesta, at Rome, and that of the Sibilla, at Tivoli.

The leaves of this capital have suffered no less variation. Vitruvius divides or outlines them after the manner of the acanthus; those of the temple of the Sibilla, at Tivoli, are of this kind. The greater part of the antique edifices present the olive leaf

divided into five. In some, they are divided into four, as at the temple of Mars the Avenger; others into three, as is seen at the temple of Vesta, at Rome. These leaves, amongst the antique examples, are sometimes unequal in their heights, the lower range being the highest; in others, the second range is the highest, and others present them perfectly equal. The part which occupies the centre of the leaves is very often cut or worked, as is observed at the Pantheon and other places. At other times it is left plain, as at the temples of Vesta, of the Sibilla, &c. The first range of leaves have ordinarily a slight projection near the inferior extremity. This form is very remarkable at the temple of Vesta.

The base which is often applied to the Corinthian column, and which is considered by some authors as most suited to this order, is that named the attic. This base is composed of an upper and lower torus, having between them a scotia, which is separated from each torus by a fillet. The base commonly assigned to this order differs from the attic in having a second scotia, two additional fillets, and two astragals.

The entablature is commonly divided into ten parts, three of which are given to the architrave, three to the frieze, and the remaining four to the cornice. These proportions are variable, and the antique edifices present much diversity in this respect. The frieze is higher than the architrave at the temple of Jupiter Tonans, as also at that of the Sibilla, whilst, on the contrary, it is less at the portico of the Pantheon, the temple of Peace, and at the Basilica of Antoninus; but the frieze is equal to the architrave in the interior of the Pantheon.

The architrave is divided into three fascias; nevertheless there are examples where there are only two.

The frieze of the Corinthian order has this peculiarity, that whilst it is susceptible of the greatest richness, it may also with great propriety be executed plain. The shaft of its column is often ornamented with flutings, although it is not uncommon to find it without; its base either receives ornaments, or offers its profiles plain. Its cornice and frieze are ordinarily the parts where the luxury of decoration has the best effect; nevertheless, there are many examples of the greatest simplicity in their embellishment, without either incoherence or disparity resulting from it.

The character of richness attached to the Corinthian order belongs to its proportions, its forms, and to their numerous and varied disposition, as much as to sculpture, which is employed only in embellishing its details. As this order presents considerable power in the extent of its details, by which expression is given in architecture; it may be observed that it is susceptible of a very great variety of modified expression, according to the taste which presides in its composition, and the employment of its means.

There exists a greater power of characterizing the intermediate shades of expression, from the simplest Doric to the richest Corinthian, than is generally imagined. The Doric, when it is necessary, is susceptible of considerable richness and elegance, of which we have many examples in Italy and in Greece, whilst considerable gravity of expression may be given to the Corinthian, as at the portico of the Pantheon; or a noble and imposing character, by the projection of its profiles, as in the fragment of the frontispiece of Nero.

METHOD OF TRACING THE CORINTHIAN MODILLION.

PLATES XII. AND XIV.

Outline the part upon which the modillion rests, as also the rose which ornaments the soffit, or under side of the corona. Take six parts for the height of the modillion, and sixteen for its projection. Form a small scale, three parts and a half in height, as in plate 12, and divide it into sixteen parts. The figure in plate 12 shows the dimensions to be given to the small squares, the angles of which serve as centres from which to describe the curved parts of the modillion. Draw the line AB, and divide it into four equal parts by perpendicular lines, which, at the intersection of the verticals coming from AB, will give the points from whence to draw the segments of the circle which completes the form of the modillion.

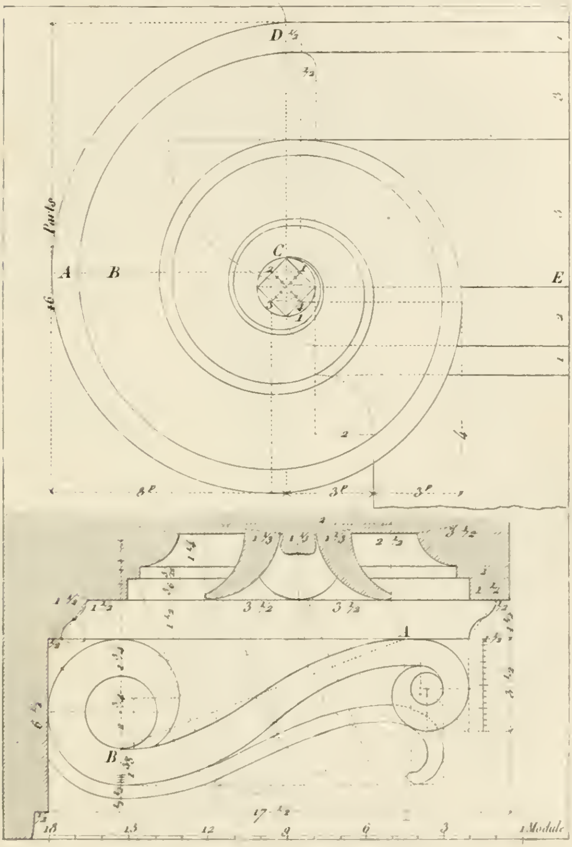
The acanthus leaf which supports the modillion, and the profile of the rose which ornaments the soffit, may also be drawn with the compasses.

METHOD OF DRAWING THE CORINTHIAN CAPITAL.

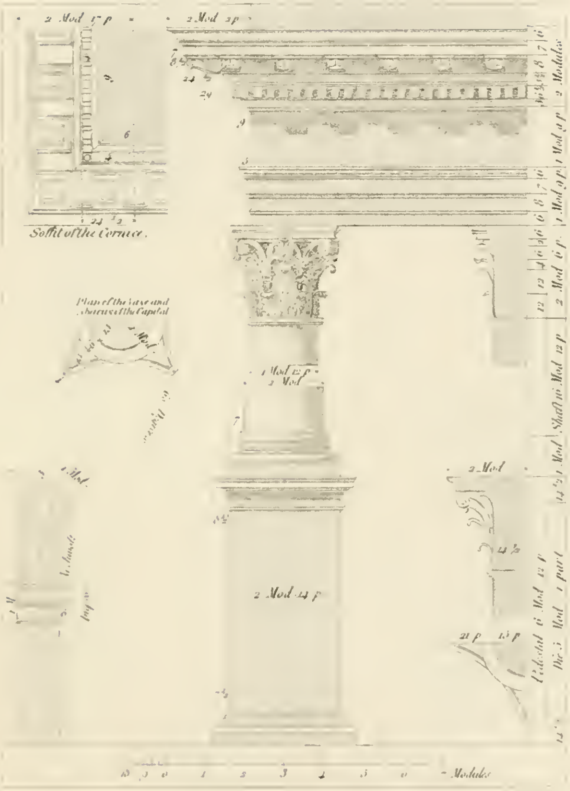
PLATE XV.

The half of the plan is given as seen in face, and the other half upon the angle. After having drawn the axis of the plan to correspond with the axis of the elevation of the capital, describe a circle of a radius

METHOD OF TRACING THE IONIC VOLUTE & CORINTHIAN MODILLION



CORINTHIAN ORDER.



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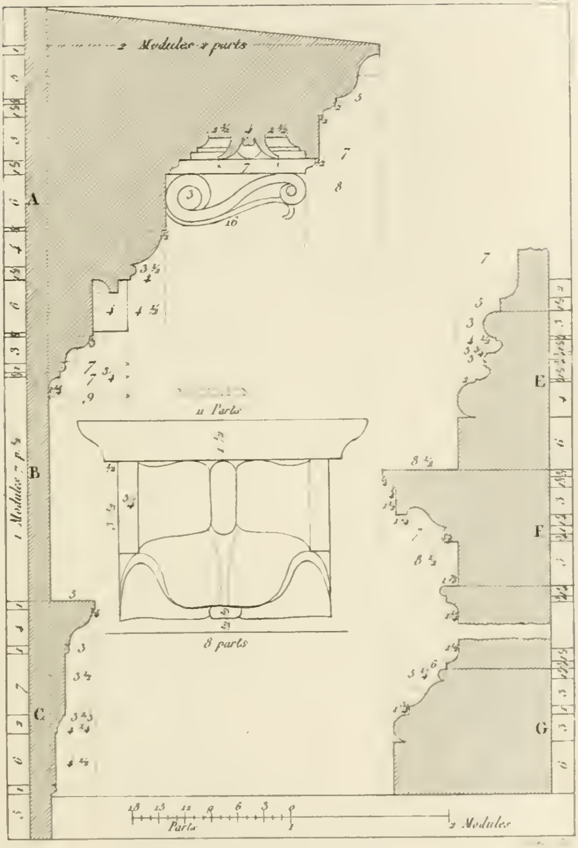
DETAILS OF THE CORINTHIAN ORDER.



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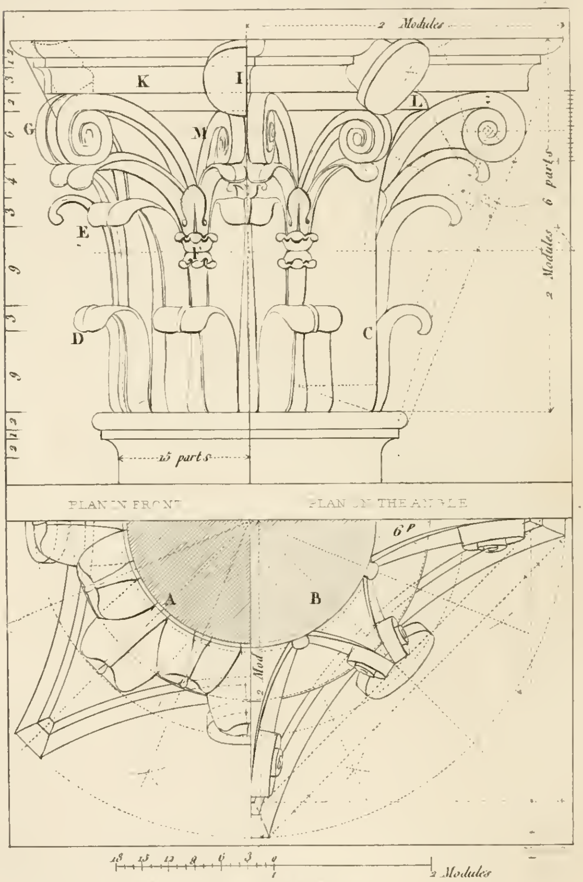
ELEVATION OF THE CORINTHIAN CAPITAL



[illegible] Bennett Three Tun Passage Ivy Lane

of two modules, and divide its circumference into sixteen equal parts. The points of division will correspond to the middle of each leaf, namely, eight for the centres of the lower range of leaves, the intermediate points forming the eight centres for the upper range. The vase of the capital is determined by a circle of a radius of fourteen parts and a half: the figure shows the circles which determine the leaves rising against the sides of the vase. The elevation shows the heights to which the projections of the plan are carried. Above the leaves are sixteen volutes, of which eight of the largest support the four angles of the abacus, and the eight smaller ones the inferior edge of the vase; as also the four flowers which ornament the middle of the abacus.

The volutes, seen in profile, may be drawn with the compasses; but they are always more agreeable to the eye when the hand afterwards completes the contours.

The different parts of the capital are marked as follows:—

A. Plan of the leaves and of the abacus.
B. Plan of the large and small volutes
C. Vase or body of the capital.
D. First range of leaves.
E. Second range of leaves.
F. Cauliculi.
G. Large volute.
H. Small volute.
I. Flower.
K. Abacus.
L. Border of the vase.

CORINTHIAN PILASTER.

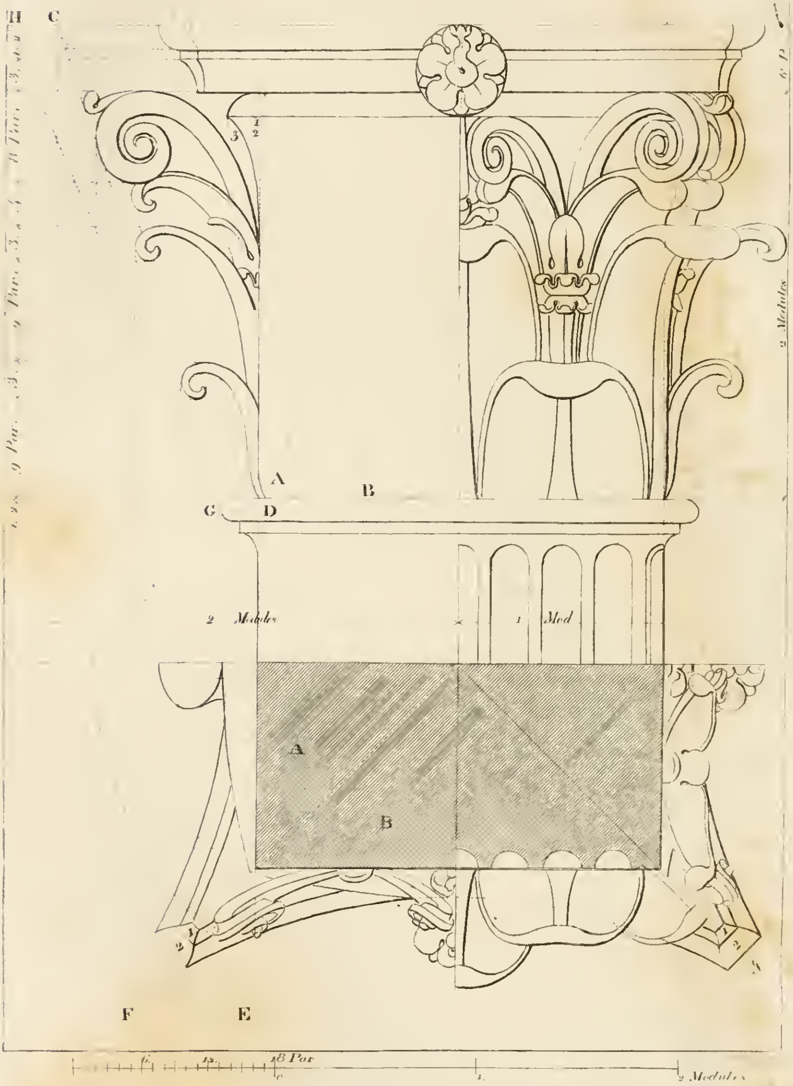
The capital of the Corinthian pilaster, like that of the Corinthian column, is decorated with two ranges of leaves, each range being in numerical proportion to those of the column, having two to each face, which gives eight for the whole. There are, however, at the Thermæ of Dioclesian, and the frontispiece of Nero, examples of twelve leaves instead of eight.

The ordinary disposition of leaves in the Corinthian pilaster is such that two are placed in the lower range, one in the upper in the centre, and two halves at the sides, which are half of the large leaves placed at the angle. It may be further remarked, that the top of the vase has not its surface straight as at the lower part, but curved. It is thus at the basilica of Antoninus, having the eighth part of the inferior diameter of the column; but at the portico of Septimus Severus, it has only one-tenth, and at the portico of the Pantheon, one-twelfth.

The present design (plate 16) of the Corinthian pilaster is a production after the example of those of the Pantheon at Rome, submitted to the proportions given by Vignola to this order. The abacus has the same diagonal projection, and a line from this point to the extremity of the astragal determines that of the leaves and volutes at the angles. The border of the vase diminishes on the sides, so as to relieve the large volutes. The projection of the volutes at the angle gives also that of the leaf under the same line. The flutings are seven in number, one of which corresponds to the middle of the small leaves, so that the remaining

CAPITAL OF CORINTHIAN PILASTER.

Pl. 16



A COMPARATIVE TABLE OF THE GENERAL PROPORTIONS OF THE COMPOSITE ORDER,

FROM THE MOST CELEBRATED EDIFICES OF ANTIQUITY,

TOGETHER WITH THOSE ASSIGNED TO IT BY THE MOST EMINENT MODERN MASTERS.

		Arch of Titus, at Rome.						*Arch of Septimus Severus, at Rome.*					
		Height of the Members.			Projection from the axis of the Columns.			Height of the Members.			Projection from the axis of the Columns.		
		Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions.
Entablature	Cornice	2	2	..	3	..	¾	2	8	½	2	21	½
	Frieze	1	14	½	....	28	¼	....	25	½	....	26	¼
	Architrave	1	16	..	1	10	¼	1	15	..	1	6	¼
		5	2	½	-	-	-	4	19	-	-	-	-
Column	Capital	2	14	¼	1	19	..	2	8	¾	1	16	..
	Shaft	16	22	..	.. 1	26 ..	½ ..	16	..	½	.. 1	26 ..	¼ ..
	Base	..	29	¾	1	14	..	1	1	..	1	12	¼
		20	6	-	-		-	19	10	-	-	-	-
Height of the Column and Entablature		25	8	½	-	-	-	23	29	-	-	-	-
Volute		1	-	½	-	-	-	-	26	¾	-	-	-
Pedestal	Cornice	..	28	½	2	12	..	1	..	..	2	10	..
	Die	4	21	..	1	15	¾	4	20	½	1	15	..
	Base	2	25	..	2	13	¾	2	1	..	2	12	½
		8	14	½	-	-	-	7	21	½	-	-	-
		Height of Members.			From face of Arcades.			Height of Members.			From face of Arcades.		
Impost		1	..	..	....	22	¾	1 1	2 10	½ ..	 1	20 2	¼ ..
Archivolt		1	11	..	....	8	..	1 1	2 12	.. ..	....	7 10	¼ ..
Key of Arcades without Pedestals		..	..	..	....	..	..	....	..	..	....	..	..
Key of Arcades with Pedestals		3	9	¾	....	..	..	2 2	5 17	.. ..	..	..	..
		Height.			Width.			Height.			Width.		
Intercolumniations from axis to axis		..	..	..	....	..	..	....	..	..	....	..	..
Columns of Arcades without Pedestals, from axis to axis		..	..	..	....	..	..	....	..	..	....	..	..
Apertures of Arcades without Pedestals		..	..	..	....	..	..	....	..	..	....	..	..
Columns of Arcades with Pedestals, from axis to axis		29	15	½	8 21	24 18	.. ¼	29	2	½	12 21	21 10	⅝ ..
Apertures of Arcades with Pedestals		26	5	..	16	24	..	16 26	13 15	.. ..	6 15	23 11	.. ½

		Thermæ of Dioclesian, at Rome.						*PALLADIO.*					
		Height of the Members.			Projection from the axis of the Columns.			Height of the Members.			Projection from the axis of the Columns.		
		Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions.
Entablature	Cornice	1	21	..	2	18	..	1	20	..	2	18	½
	Frieze	1	14	..	....	27	..	1	..	..	1	5	..
	Architrave	1	14	½	1	3	¼	1	10	..	1	5	¾
		4	19	½	-	-	-	4	-	-	-	-	-
Column	Capital	2	11	..	1	16	..	2	10	..	1	15	..
	Shaft	16	17	½	.. 1	26 ..	.. ..	16	18	½	.. 1	26 ..	.. ..
	Base	1	1	¼	1	13	¾	1	1	½	1	12	..
		19	29	¾	-	-	-	20	-	-	-	-	-
Height of the Column and Entablature		24	19	¼	-	-	-	24	-	-	-	-	-
Volute		-	22	½	-	-	-	-	25	¾	-	-	-
Pedestal	Cornice	..	..	..	....	..	..	..	25	¼	1	27	..
	Die	..	..	..	....	..	..	4	4	¾	1	12	..
	Base	..	..	..	....	..	..	1	20	..	1	27	..
		-	-	-	-	-	-	6	20	-	-	-	-
		Height of Members.			From face of Arcades.			Height of Members.			From face of Arcades.		
Impost			..	..	....	..	..	1	9	¾	....	15	..
Archivolt			..	..	....	..	..	1	..	½	....	6	..
Key of Arcades without Pedestals		..	..	..	....	..	..	..	..	..	....	..	..
Key of Arcades with Pedestals		..	..	..	....	..	..	2	..	..	....	..	..
		Height.			Width.			Height.			Width.		
Intercolumniations from axis to axis		..	..	..	....	..	..	..	..	..	5	..	..
Columns of Arcades without Pedestals, from axis to axis		..	..	..	....	..	..	..	..	..	....	..	..
Apertures of Arcades without Pedestals		..	..	..	....	..	..	..	..	..	....	..	..
Columns of Arcades with Pedestals, from axis to axis			..	..	....	..	..	..	..	..	14	15	..
Apertures of Arcades with Pedestals			..	..	....	..	..	24	20	..	9	21	..

		SCAMOZZI.						*VIGNOLA.*					
		Height of the Members.			Projection from the axis of the Columns.			Height of the Members.			Projection from the axis of the Columns.		
		Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions.
Entablature	Cornice	1	16	¾	2	13	..	2	..	..	2	25	..
	Frieze	1	1	¼	....	26	..	1	15	..	....	25	..
	Architrave	1	9	..	1	3	..	1	15	..	1	6	¾
		3	27	-	-	-	-	5	-	-	-	-	-
Column	Capital	2	10	..	1	15	..	2	10	..	1	16	..
	Shaft	16	5	..	.. 1	26 ..	.. ..	16	20	..	.. 1	25 ..	.. ..
	Base	1	..	..	1	11	..	1	..	..	1	11	¾
		19	15	-	-	-	-	20	-	-	-	-	-
Height of the Column and Entablature		23	12	-	-	·		25	-	-	-	-	-
Volute		-	25	½	-	-	-	-	26	¾	-	-	-
Pedestal	Cornice	..	22	½	1	28	..	..	23	½	1	25	..
	Die	3	24	..	1	11	..	5	6	¾	1	11	¾
	Base	1	15	..	1	25	..	..	20	..	1	25	..
		6	1	½	-	-	-	6	20	-	-	-	-
		Height of Members.			From face of Arcades.			Height of Members.			From face of Arcades.		
Impost		1	1	½	....	13	½	1	..	..	....	10	..
Archivolt		..	28	..	....	6	..	1	..	..	....	8	..
Key of Arcades without Pedestals		1	25	..	....	..	..	..	..	..	....	..	..
Key of Arcades with Pedestals		2	..	..	....	..	..	1	20	..	....	..	..
		Height.			Width.			Height.			Width.		
Intercolumniations from axis to axis		..	..	..	5 6	10 12		..	..	..	6	20	..
Columns of Arcades without Pedestals, from axis to axis		20	15	..	12	24	..	..	..	..	12	..	..
Apertures of Arcades without Pedestals		18	20	..	8	28	..	18	..	..	9	..	..
Columns of Arcades with Pedestals, from axis to axis		25	16	½	14	28	..	..	..	..	16	..	..
Apertures of Arcades with Pedestals		23	16	½	10	23	..	25	..	..	12	..	..

Between the bases of the columns and cornices of the pedestals of the Arches of Titus and Septimus Severus is a second plinth, or socle, which in the former is 25 parts in height, and 1 module and 15¾ parts in projection from the axis of the column; and in the latter 20 parts in height, and 1 module and 14¾ parts in projection. The arch of Septimus Severus has also a socle under the bases of its pedestals 1 module and 11 parts in height, and 2 modules and 12¼ parts in projection, which dimensions are not included in the separate proportions of the column and pedestal, but in the height given of the columns of arcades with pedestals. There is likewise a socle under the bases of the columns without pedestals of the arcades of Scamozzi 1 module in height, and 1 module and 14 parts in projection, taken from the axis of the column, which dimension will be found included in its proper place

☞ The module employed in this table is divided into thirty parts

COMPOSITE ORDER,

WITH THE NAMES AND DETAILED PROPORTIONS OF THE MEMBERS AND MOULDINGS OF WHICH THE ORDER IS COMPOSED.

PLATES 17, 18, 19, 20, and 21.

ENTABLATURE.		Heights.			Projections from axis of Columns.		
		Modules	Parts or Minutes.	Fractions.	Modules.	Parts or Minutes.	Fractions.
Entablature 5 modules.	**A. CORNICE.**						
	Fillet	..	1	½	2	15	..
	Cyma Recta	..	5	..	2	15	..
	Fillet	..	1	..	2	10	..
	Cyma Talon	..	2	..	2	9	½
	Astragal	..	1	..	2	7	½
	Corona	..	5	..	2	7	..
	Cyma Recta under Corona	..	1	½	2	5	..
	Fillet	..	1	..	1	15	..
	Cyma Talon	..	4	..	1	14	½
	Fillet	..	....	½	1	11	..
	* String of Dentils	..	2	..	1	8	..
	Dentils	..	7	½	1	11	..
	Rest of Band behind Dentils	..	1	..	1	5	..
	Quarter Round	..	5	..	1	4	..
		2	-	-			
	B FRIEZE.						
	Astragal	..	1	..	....	17	..
	Fillet	..	....	½	....	16	½
	Conge	..	1	..	....	15	..
	Frieze	..	17	½	....	15	..
	Conge	..	7	..	1	4	..
		1	9	-			
	C. ARCHITRAVE.						
	Fillet	..	1	..	1	4	..
	Cavetto	..	2	..	1	2	½
	Quarter Round	..	3	..	1	2	..
	Astragal	..	1	..	....	17	½
	First Fascia	..	10	..	....	17	..
	Cyma Talon	..	2	..	....	16	½
	Second Fascie	..	8	..	....	15	..
		1	9	-			

COLUMN AND PEDESTAL.		Heights.			Projections from axis of Columns.		
		Modules	Parts or Minutes.	Fractions.	Modules.	Parts or Minutes.	Fractions.
Column 20 modules.	**CAPITAL.**						
	Capital (*For Details see Plates* 17, 19, & 20)	2	6	..	1	9	..
		2	6	-			
	SHAFT.						
	Astragal	..	2	..	1	....	..
	Fillet	..	1	..	....	17	..
	Conge	..	2	..	....	15	..
	Shaft between Conges	16	3	½	{.. 1	15	.. ..
	Conge	..	2	..	1	2	..
	Fillet	..	1	½	1	2	..
		16	12	-			
	E. BASE.						
	Torus	..	3	..	1	4	..
	Fillet	..	....	½	1	2	½
	Scotia	..	1	½	1	2	..
	Fillet	..	....	½	1	3	⅛
	Astragal	..	....	½	1	3	½
	Fillet	..	....	¼	1	3	⅛
	Scotia	..	2	..	1	2	⅝
	Fillet	..	....	½	1	5	..
	Torus	..	4	..	1	7	..
	Plinth	..	6	..	1	7	..
		1	-	-			
Pedestal 6 mod. 12 parts.	**F. CORNICE.**						
	Fillet	..	....	¾	1	15	..
	Cyma Talon	..	1	½	1	14	¾
	Corona	..	3	..	1	13	½
	Cyma Recta	.	1	½	1	10	½
	Fillet	..	....	½	1	8	¼
	Cavetto	..	1	..	1	7	¼
	Frieze	.	5	..	1	7	..
	Astragal		1	..	1	9	
		-	14	-			
	DIE						
	Fillet	..	1	..	1	8	¼
	Conge	..	1	¼	1	7	..
	Die	4	16	¾	1	7	..
	Conge	..	2	..	1	9	..
	Fillet	..	1	..	1	9	..
		5	4	-			
	G. BASE.						
	Astragal	..	1	..	1	9	¾
	Cyma Reversa	..	3	..	1	12	¼
	Fillet	..	1	..	1	13	¼
	Torus	..	3	..	1	15	..
	Plinth	..	4	..	1	15	..
		-	12				
	Total	31	12				

* The height of the string of dentils is taken in that of the dentils.

☞ The module employed in this Table is divided into eighteen parts

space at the angle of the pilaster would become too large, if not ornamented with an astragal which extends the whole height of the shaft of the pilaster. If it is found necessary to the regularity of the soffit to diminish the superior diameter of the pilaster A, according to that of the column behind which it is intended to be placed, the disposition of the leaves will then change their place to B, and become narrower. All the projections in the proportions given by the line drawn from the extremity of the diagonal of the abacus C to the astragal D, equally retire; but the height of the whole still remains the same. It may sometimes happen, in decorating a façade with pilasters, that according to this first design, the abacus may not have sufficient projection; in such cases it may receive the same apparent projection as that of the abacus of columns, from the face of the architrave E, to the extremity of the diagonal F, giving the same projections to all the leaves and volutes on the line GH, so as to give it greater development, since on these occasions there is no necessary restraint on account of its being employed independent of columns.

THE COMPOSITE ORDER.

The order named Composite owes its origin entirely to the moderns. More than one cause has operated in giving rise to the unnecessary distinction of this supposed order; and among the most prominent may be enumerated an erroneous mode of reasoning, resulting from a want of adequate knowledge of the true principles on which invention in architecture is founded

together with a hasty assumption of the existence of this order from equivocal examples; an ignorance of the character of numerous antique edifices, in which the greatest variety of decoration may be found in the same order; and a consequent erroneous judgment.

The orders are to architecture what tones are to music, or the proportions of the human form to painting and sculpture; and it would be equally as ridiculous to seek new modes of architecture, as to assume new proportions in the structure of man. This false idea of invention, which has so gratuitously employed the genius of certain architects, has indeed been the real origin of the pretended Composite order.

The principal mistake of those who believed in the invention of new orders, rested upon an illusion very easily dissipated. They imagined, in their inventive mania, that to compose a capital in the taste of a new adjustment, was sufficient to produce a new order; they believed that to change the profiles of a base, in substituting one moulding in the place of another, or of adapting to the capital of a column some few allegorical emblems, was sufficient to entitle them to the honour of having formed a new order. The three orders of architecture possess the entire means whereby this art renders sensible the various grades of character or expression; and though that expression or character may be considerably varied, and something novel produced, yet it will be found upon close examination, to result only from a combination of the means contained in the three primitive orders, and not from invention.

Thus, the pretended Tuscan order, which the moderns have believed to be a superlative of the Doric, exhibits in reality but a diminution of the cha-

racter of strength of this order; whilst the supposed Composite has been placed from its conformation between the Ionic and Corinthian, without possessing either the elegance of the one, or the richness of the other.

It is not intended to deduce from the above, that architecture is confined to three distinct ratios of proportion in the three orders, or that it cannot nor ought to modulate them, when necessary to express the various shades requisite to characterize the different edifices. On the contrary, it is in the happy combination of different proportions, &c., that the talent of the architect displays itself; the proportions of each order being so susceptible of variety, that the art draws from thence its most numerous resources for the expression of difference in character. And since it cannot be denied that the proportions are the true characteristics of each order, it must be left to taste sometimes to vary the accessories, which are still more distinctive in appearance than the substance of the order itself.

The decoration of the capitals of columns may be placed amongst the number of these accessory parts; for it is neither by the echinus, the volutes, nor the foliage alone, that the intelligent mind will determine the essentially distinguishing character of the orders.

In speaking of the Corinthian order, it was shown that the decoration of the capital of this name, is entirely independent of its form; and it shall now be proved that the ancients, without changing its essential form, have diversified its decoration *ad infinitum.*

If the opinion be erroneous that decoration constitutes the capital, and that any new ornament applied

to its form may produce a new species of capital, it is still more erroneous to make the existence of a new order depend, not in a new composition of proportions, nor in a particular distribution of the modinature and forms, neither in a characteristic formation of a capital, but solely in a new combination of ornaments, or of the parts of capitals.

Now the pretended Composite order has the same proportions, the same modinature, the same principles, and the same form of capital as the Corinthian order; it differs only in the combination of the ornaments of two capitals, and therefore does not contain that which is requisite to constitute a new order.

It is not amongst the Romans, with whom this new order is pretended to have had its origin, that we must seek for examples and authorities to justify the supposition; for it may be shown, in the most satisfactory manner, by a deep and accurate investigation of the varied symbolical compositions employed by the Romans in the decoration of capitals, to mark more strongly the character of particular monuments, that they who are represented as its inventors did not so much as suspect its existence. If the architecture of the Arch of Titus be examined, there will not be found either in the profiles of the entablature, or in those of the base of the column, in the proportion, or in the decoration of the ordonnance, greater variety than is frequently found between one antique edifice of the Corinthian order and another. There is in every respect a greater difference between the Corinthian of the frontispiece of Nero and that of the Pantheon, or of the Thermæ of Dioclesian, than between the pretended Composite of the Arch of Titus and the

frontispiece of Nero above-mentioned; that difference being only in a part of the decoration of the capital. But if the difference of the capital constitutes an order, it follows that there must be as many different orders as there can be found capitals; consequently several hundreds may be enumerated.

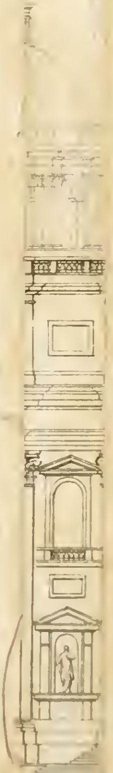
The ancients, considered the capitals of columns rather under a significant relation, (of which allegory might avail itself to characterize the particular uses of edifices,) than as the characteristic types of architecture. The Corinthian capital, by the extent of its developments, variety of its aspects, facility of modifying its decoration to the purposes of allegory, and the richness of its sculpture, was that which best answered their taste for symbols and the magnificence of attributes.

To prove what has been asserted, reference may be made to the collection of antique fragments by Piranesi, to shew the fertile invention of the ancients in the composition of capitals, and the decoration of the Corinthian order. These examples are taken from hundreds of the same kind, which have escaped the general destruction of Roman magnificence, and which will serve to show that the existence of a pretended Composite order, is in reality but a precedent transmitted to us by the renovators of architecture, the existence of which as a distinct order is instantly destroyed by the indicated comparison.

The only just inference that can be deduced from these facts and authorities is, that the pretended Composed or Composite capital, is but one of the thousand and more capitals invented amongst the Romans; and which has no more claim to a distinct

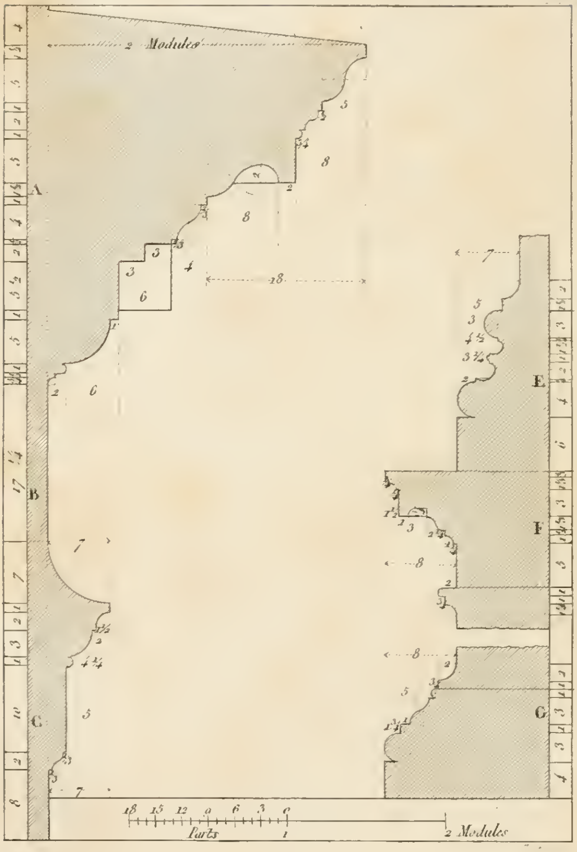
place amongst the orders than those which have just been referred to.

There are three things very distinct in the Doric, Ionic, and Corinthian orders; their form, ornament, and proportion. These three distinguish themselves from the other two, the supposed Tuscan and Composite, in all these points: therefore it must be a great mistake to pretend to invent a new order by changing one of these characteristics only. For if the form be changed without changing the ornaments, or the ornaments without the form, or both without changing the proportion, the production would be nothing new. In architecture, as in other arts, the ancients acknowledged only three points of comparison; the *greatest*, the *least*, and the *medium* between the two. All the edifices of which we have any knowledge, or that it is possible to invent, always express in their appearance *more* or *less* solidity, gravity, simplicity or elegance, lightness, grace or magnificence. As between the *greatest* and the *least* there can be but one *mean* term that unites in a certain degree these opposite qualities, the ancients have done nothing more than fix these three terms. In the Doric, by the characters which convey the idea of solid supports, grave ornaments, and strong or short proportions. In the Corinthian, by the most delicate forms, by rich decoration, and by light and graceful proportion. In the medium, or Ionic order, by the medium employment of forms, ornaments, and proportions equally distant from the strength and simplicity of the one, and the lightness and richness of the other.

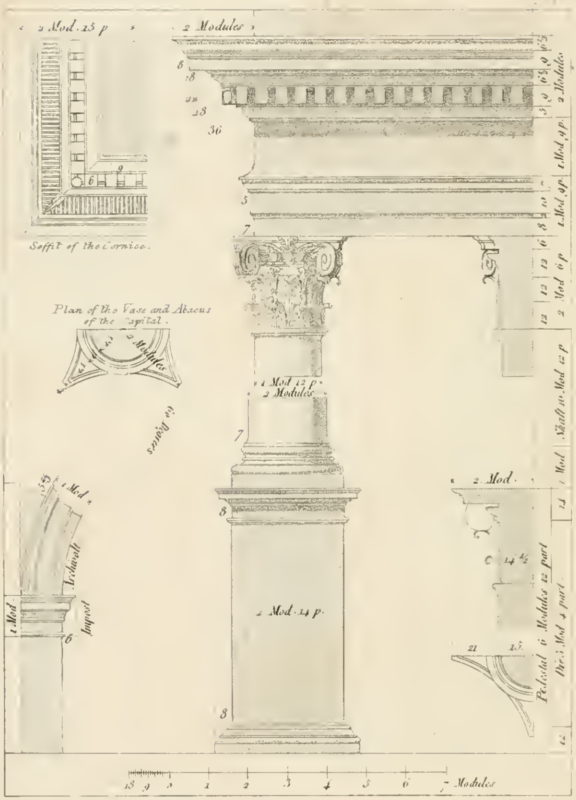


ELEVATION OF THE [illegible] AT ROME.

DETAILS OF THE COMPOSITE ORDER



COMPOSITE ORDER.



METHOD OF DRAWING THE COMPOSITE CAPITAL.

PLATES XIX. AND XX.

The Composite capital consists in the union of a part of the Ionic and Corinthian capitals. It has only eight volutes, which repose upon the second range of leaves, and in ascending, enter into part of the abacus. Its total mass is the same as that of the Corinthian. The two ranges of leaves are the same, and consequently the body of the vase has the same proportion.

The abacus, which crowns the capital, has also the same form in its plan.

The volute of this capital, vertically developed, and seen in face, is drawn in the same manner as the Ionic volute; but as regards its position in a design, it can only be well described by the hand.

It may be seen by the plan, that these volutes are inclined, and partake of the curvature of the abacus.

The plan of the Composite capital should be disposed in the same manner as that of the Corinthian, at the same time paying great attention to pursue the same method for the elevation of the corresponding points. The parts of the capital, as shown in plate 19, are as follows:

A. Plan seen in face.
B. Plan seen upon the angle.
C. Vase or body of the capital.
D. First range of leaves.
E. Second range of leaves.
F. Volutes.
G. Flower.
H. Abacus.

TO OBTAIN A PROPORTIONAL GRADATION OF THE ORDERS.

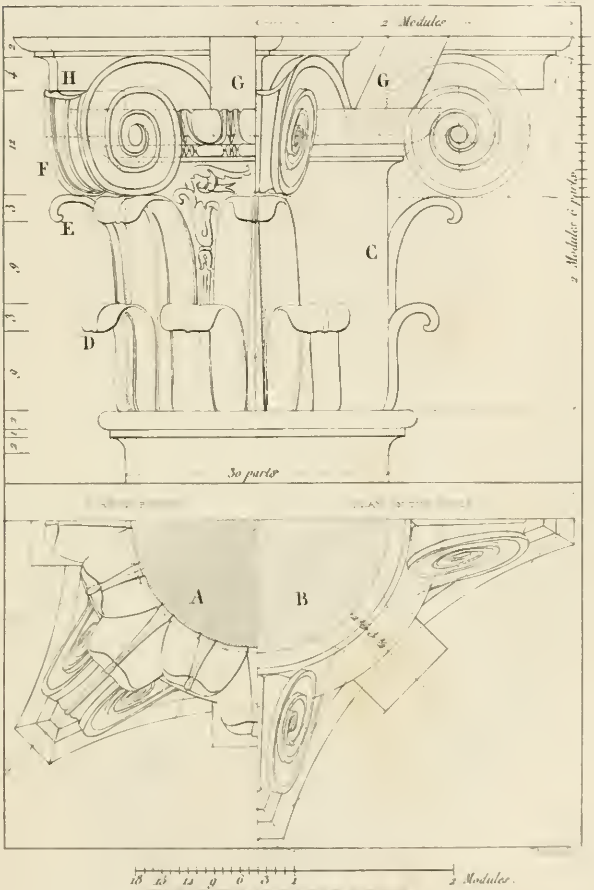
PLATE XXII.

To compare the orders of architecture with each other, take a line of any convenient dimension for the height of the Tuscan order, and divide it into nineteen equal parts, four of which will give the extreme height of the pedestal, twelve that of the column, and three that of the entablature.

The module adopted for the Tuscan order being the fourteenth part of the total height of the column, it follows that the nineteen divisions of the entire of the order should be thus subdivided. The four divisions of the pedestal will be four modules and eight parts; the twelve divisions of the columns fourteen modules; lastly, the three divisions of the entablature, three modules and six parts.

To determine the relative height of the Corinthian order, take a line of ten modules in length from the Tuscan scale, and divide it into twelve equal parts, which will give a scale of modules for the Corinthian. From this scale erect a perpendicular line of thirty-one modules and twelve parts, at any convenient distance from the axis of the Tuscan column, and divide it into nineteen equal parts. The four divisions for the pedestal will then be equal to six modules and twelve parts, the three divisions for the entablature equal to five modules, and lastly, the twelve divisions for the column equal to twenty modules of the scale of the Corinthian.

ELEVATION OF THE COMPOSITE CAPITAL.



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CORINTHIAN CAPITAL.

COMPOSITE CAPITAL.

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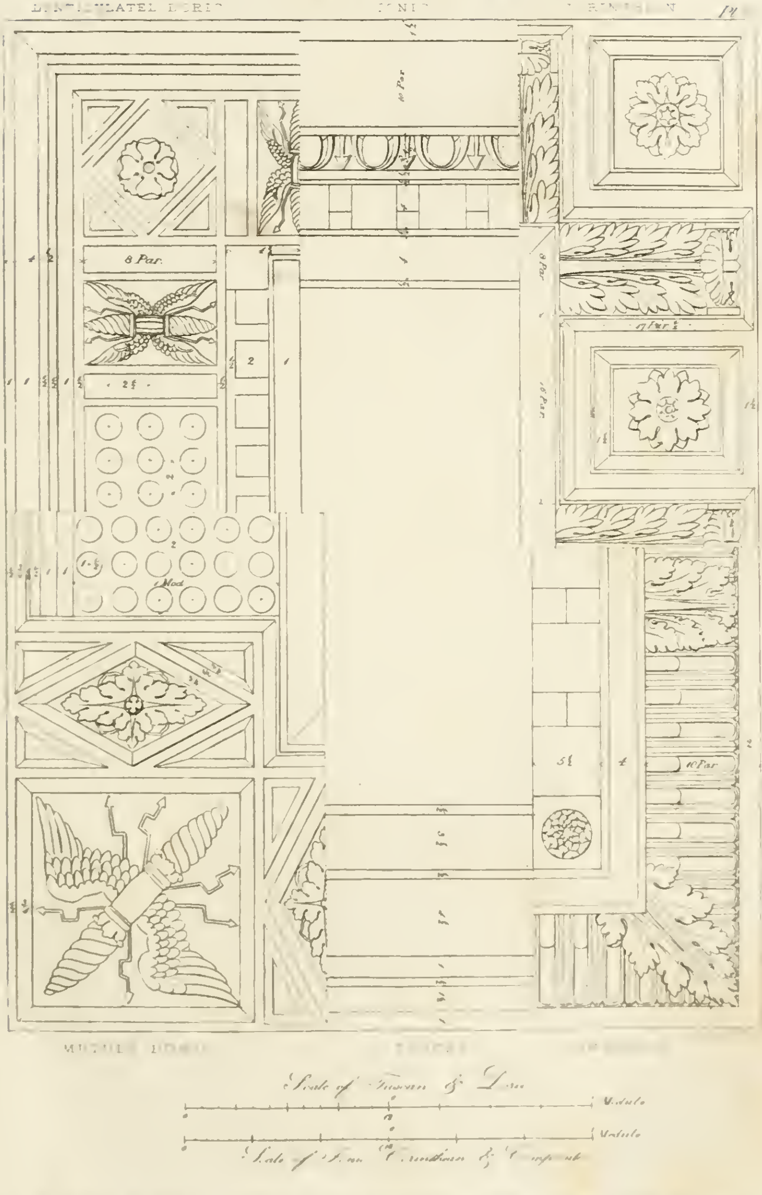
SOFFITS OF THE FIVE ORDERS.



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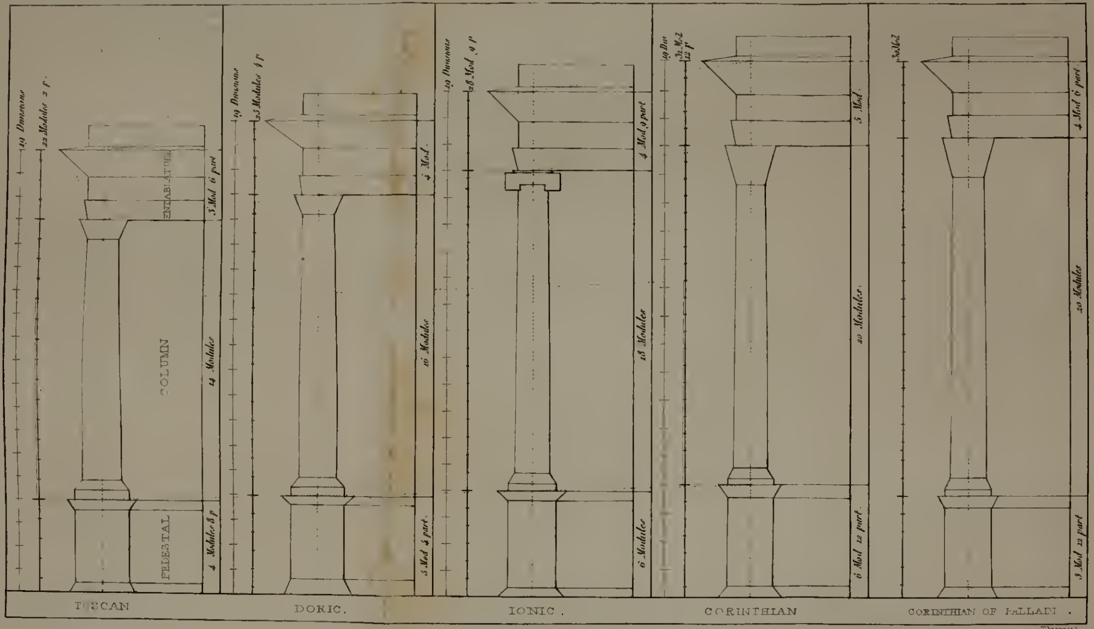
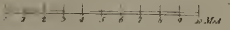
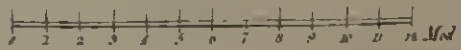
TO OBTAIN A PROPORTIONAL GRADATION OF THE ORDERS.



Thierry Sc.



To obtain a Proportional Gradation of the Orders, the Scale of the Tuscan Order must be first determined from which ten Modules must be taken and divided into Twelve which will give the Scale to fix the height of the Corinthian Order.



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Having proceeded thus far, raise at equal distances between them two other vertical lines, to form the axis of the Doric and Ionic orders. Draw a line from the top of the axis of the Corinthian order to the top of that of the Tuscan, and the points of intersection between this line and the two axes of the Doric and Ionic will give the corresponding heights of the parts of these intermediate orders, as is shown in plate 22.

The Composite order being of the same dimensions as the Corinthian, it was considered better to substitute upon the same plate, the proportions of the Corinthian of Palladio, as presented in some of the edifices erected in Italy.

DIMINUTION AND ENTASIS OF THE SHAFTS OF COLUMNS.

PLATE XXIII.

The ancients have diminished and imperceptibly curved the outline of the shafts of their columns; commencing either from a third of the height of the shaft, taken from the top part of the superior torus of the base, or otherwise from its lower diameter, and likewise from the astragal, if there be one, to the under part of the astragal upon which the capital is placed. The fillet over the base always forms a part of the shaft, as also does the astragal at the upper extremity; the projection of which from the centre of the column always corresponds to half the lower diameter of the shaft, which is of one module. The outline of those which diminish from the bottom to the top is not precisely straight, but is slightly curved, as may be seen

by the first figure. The second example is most practised, and may be employed when the diminution is intended to commence from one-third of the height. This last means may serve for any height, by multiplying the divisions from the inferior to the superior diameter.

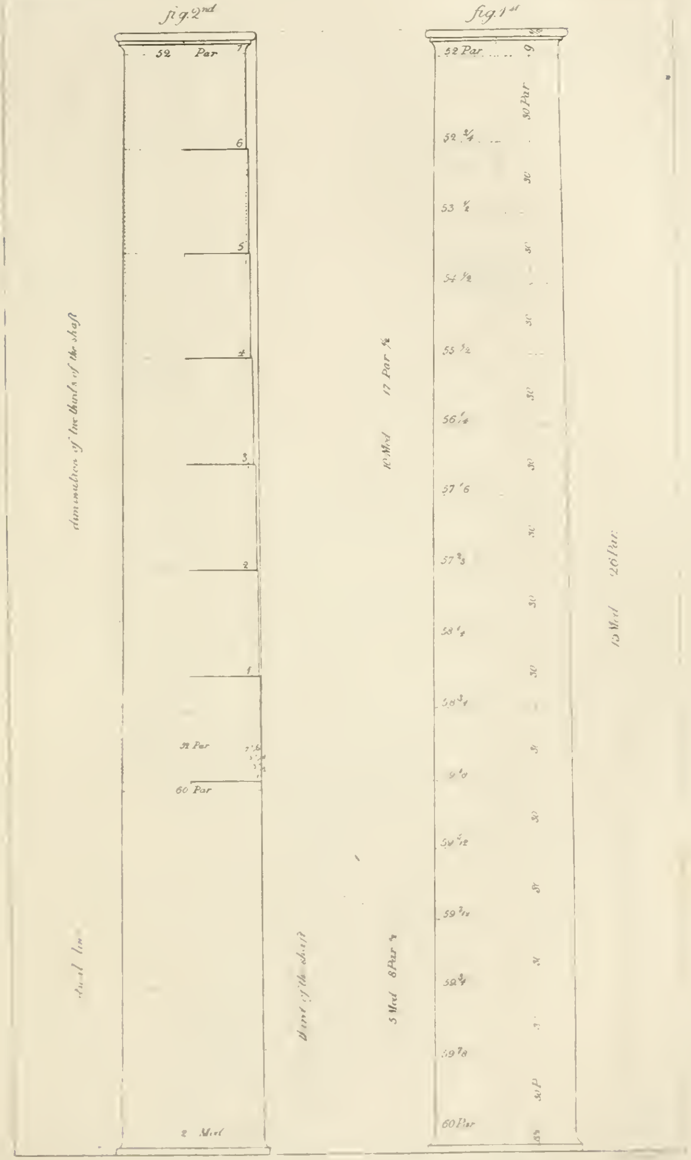
A TABLE OF THE DIMINUTION OF COLUMNS, TAKEN FROM THE BEST ANTIQUE EXAMPLES.

	SHAFTS OF COLUMNS	OF THE SHAFTS.						
		Proportion.			Height.		Diminution.	
		Modules.	Parts.	Fractions.	Feet.	Inches.	Parts.	Fractions.
Doric	Temple of Theseus, at Athens	10	..	..	17	1	13	..
	Temple of Minerva, at Athens	10	2	..	31	1½	12	½
	Theatre of Marcellus	14	15	⅔	23	4¾	12	⅔
Ionic	Temple on the Ilissus, at Athens	14	2	¾	..	..	9	..
	Temple of Minerva Polias, at Athens	16	22	½	18	10¼	10	..
	Temple of Fortuna Virilis	15	10	..	24	4¾	7	½
	Temple of Concord	17	6	..	38	5	10	½
	Theatre of Marcellus	16	10	½	21	1	9	½
Corinthian	Temple of Jupiter Tonans	17	4	⅔	39	3½	8	..
	Temple of Jupiter Stator	17	..	..	40	8	8	½
	Interior of the Pantheon	15	26	..	29	4	8	..
	Altars of the Pantheon	15	23	..	11	7½	8	..
	Portico of the Pantheon	16	8	..	40	2¼	7	⅔
	Temple of Vesta	18	24	..	29	3	6	½
	Temple of the Sibilla	16	8	..	20	3¼	8	..
	Frontispiece of Nero	16	10	⅔	52	5½	7	..
	Temple of Peace	17	10	..	52	6¾	6	½
	Colosseum	14	19	¼	21	4½	5	..
	Temple of Faustina	15	28	..	38	7⅔	7	½
	Basilica of Antoninus	17	..	½	40	5	7	⅔
	Portico of Septimus	22	6	..	28	9	7	⅓
	Arch of Constantine	15	25	..	23	¼	7	..
Composite	Arch of Titus	16	22	..	17	4	7	..
	Arch of Septimus	16	..	⅓	23	1½	7	½
	Thermæ of Dioclesian	16	17	½	38	4½	8	..
	Temple of Bacchus	15	23	..	11	5	6	½

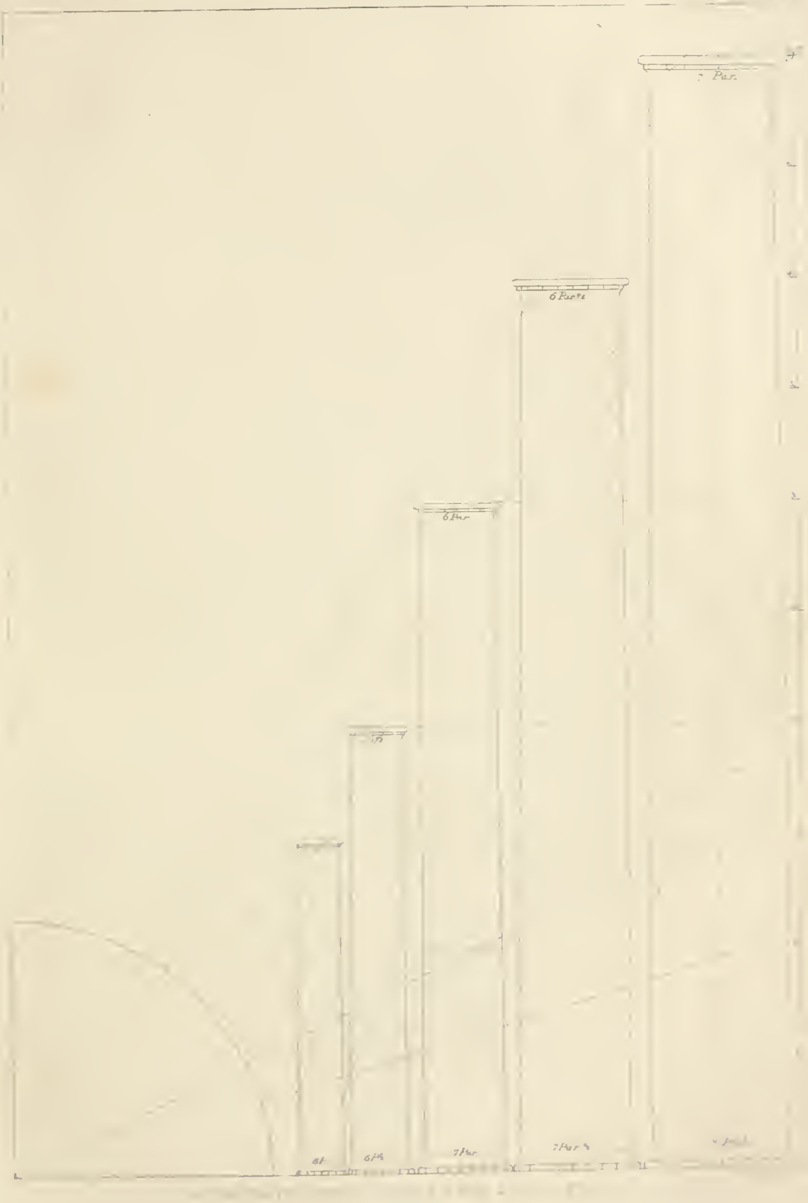
The diminution of the shafts of the columns, in all the antique edifices at Rome, commences from their inferior diameters; except in those at the Colosseum, Arches of Severus and Constantine, and Temple of the Sibilla, at Tivoli, where it commences from a third of their height.

N. B. The above Table presents both the height and proportion of each of the shafts of the different orders of columns it contains, thereby facilitating the comparison of their diminution, which is of the whole of the superior diameter of the shaft. The module employed is divided into thirty parts.

DIMINUTION OF COLUMNS



DIMINUTION OF THE SHAFTS OF COLUMNS



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RULES OF PROPORTION FOR THE DIMINUTION WHICH SHOULD BE GIVEN TO THE SUPERIOR DIAMETER OF THE SHAFTS OF THE DIFFERENT COLUMNS, ACCORDING TO THEIR HEIGHT, FROM FIFTEEN FEET TO FIFTY.

PLATE XXV.

The shafts of columns of fifteen feet should have the inferior diameter of their shaft divided into six parts; five of these same parts given to the superior diameter of the shaft will determine the diminution. Those of twenty feet, being divided into six parts and a half at their lower diameter, should be reduced at their upper diameter to five parts and a half. Those of thirty feet must be divided into seven parts at their lower diameter, and reduced at the upper to six. Those of forty feet, being divided at their inferior diameter into seven parts and a half, must be reduced at the superior diameter, under the astragal, to six parts and a half. Lastly, those of fifty feet in height, should be divided into eight parts at their inferior diameter, seven of which should be given for the superior diameter.

The same plate likewise explains the reason why columns of different heights should vary in their diminution; by showing that the lines which proceed from that part of any object which is situated at a considerable elevation, forms a more acute angle to the sight than those connected with one of equal dimensions, but which is less elevated.

These are the rules and opinions given by Vitruvius; yet the remains of antiquity do not furnish us

with examples where they have been strictly applied (*see* the TABLE); which serves to show that rules of this kind, as well as all others, require a suitable modification, according to the attendant circumstances, which the judgment of the artist can alone determine.

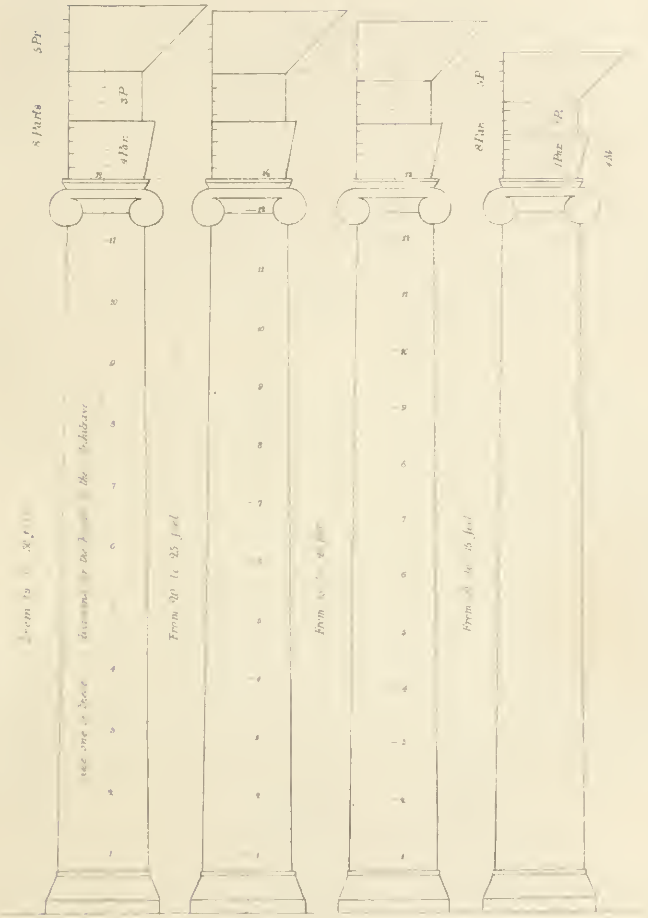
These different proportions do not change in the least those fixed upon for modern capitals. Those which are antique may be consulted under the different relations of the heights of the columns, nearly all of which vary, either in their general proportions, or in those of their details. (*See* the TABLE of each of the ORDERS.)

PROPORTION OF ENTABLATURES, ACCORDING TO THE HEIGHTS OF THE COLUMNS, AFTER THE MANNER OF VITRUVIUS.

PLATE XXV.

FOR columns from twelve to fifteen feet high, the architrave should have half a diameter in height; and dividing the architrave into four parts, three should be given for the height of the frieze. Those from fifteen to twenty feet should be divided into thirteen parts, one of which will be the height of the architrave. Divide this part into four others, and appropriate three for the height of the frieze. For those from twenty to twenty-five feet, the columns must be divided into twelve parts and a half, and one of these parts will be the height of the architrave. The frieze

PROPORTION OF ENTABLATURES



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has the same proportion as the example last mentioned.

Columns from twenty-five to thirty feet must have their height divided into twelve parts: one of these parts will give the height of the architrave. The frieze has the same proportion as the preceding example.

If it is wished to place a basso-relievo, or any other ornament, on the frieze, it is then necessary to make it equal to the whole height of the architrave, and to give to the cornice such a proportion as is stated below.

The different proportions that Vitruvius assigns for each of the mouldings which compose his entablatures, do not coincide with any other adjustment. The proportional heights are as follow. The architrave and frieze, being already determined by the rules before given, must be divided into eight equal parts; and taking five for the height of the cornice, in which height its mouldings must be distributed, observe that their total projection, perpendicular from the face of the frieze, must be equal to the height of the cornice; so that if the cornice have two modules in height, it will also have two modules of projection.

The columns in this plate are drawn to an equal height, having only marked on each the relative proportion which ought to exist between the column and entablature; it being considered more easy to judge of the differences in the proportion of entablatures when compared one with another, than when each is compared with its column.

The proportion of entablatures may always be the same with relation to columns; but the members of

which they are composed ought to have more or less expression, at all times avoiding confusion, according to their different dimensions.

This rule for the entablatures supported by columns, is applicable more or less to those employed in the generality of buildings, which may be characterized either by simplicity or richness; and also by the ordonnance of the details, in such a manner that they will clearly express the character of the order to which they belong, although there be neither columns nor pilasters employed.

INTERCOLUMNIATIONS FOR SACRED AND OTHER PUBLIC EDIFICES, ACCORDING TO VITRUVIUS.

The intercolumniation for the Ionic order of six columns in front, should be six modules, or three diameters, from the axis of one column to that of the other; the centre one being four diameters.

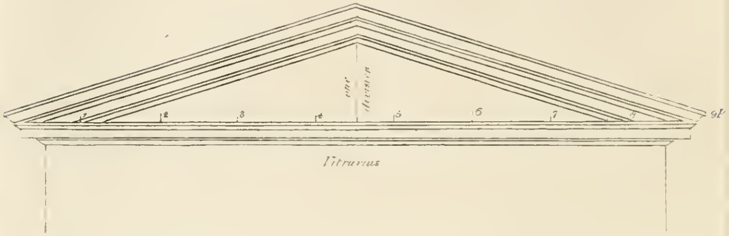
In the Corinthian order of eight columns in front, the intercolumniation should be six modules, or three diameters from axis to axis; the centre one being three diameters and a half.

In the Ionic order of eight columns in front, the intercolumniation should be three diameters and a quarter from axis to axis; the centre one five diameters.

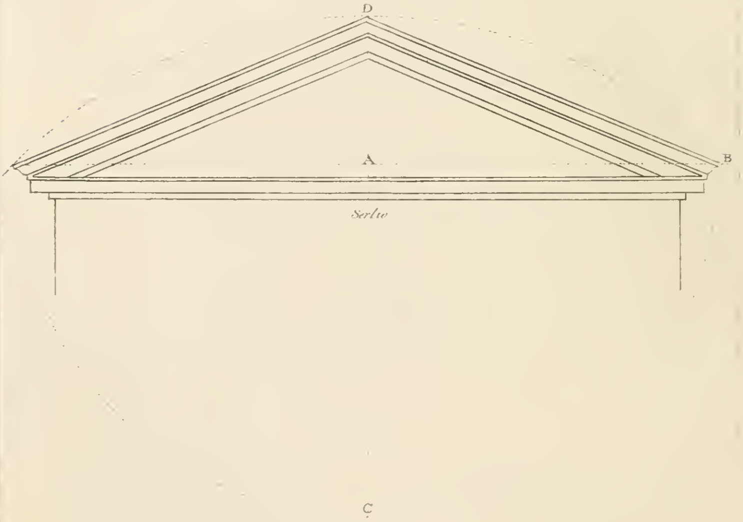
The intercolumniation for the Corinthian order of ten columns in front, should be two diameters and a half from axis to axis; the centre one three diameters.

The reason assigned by Vitruvius for making the

PROPORTION OF PEDIMENTS.



Vitruvius



Serlio

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centre intercolumniation larger than the others, appears to be frivolous; as by it the entire symmetry of an ordonnance is sacrificed, merely to allow of (and that from only a single point of sight) the whole of the aperture of the entrance door being seen.

The intercolumniations of the Doric order in Greece are, at the Temple of Theseus at Athens, five modules, six parts, taken to the axis or centre of each column. The portico of the Temple of Minerva at Athens, four modules, and twenty parts. And at the portico of Philip, in the Isle of Delos, seven modules and five parts.

The intercolumniations of the Ionic order at Athens are, at the temple on the Ilissus, six modules, fifteen parts. The Temple of Erectheus, five modules; and at the Temple of Minerva Polias, eight modules.

The only principle of taste that can be advanced as regards intercolumniations, is governed by the effects which ought to characterize the compositions in which the columns are employed.

PEDIMENTS, ACCORDING TO VITRUVIUS.

PLATE XXVI.

If it be required to crown these intercolumniations with pediments, it is necessary, after having determined the proportion of the entablature, (whether it be a fourth, or between a fourth and a fifth, or a fifth of the height of the columns, or of whatever other proportion it may be,) to divide the space in the

whole length of the cornice, from the extremity of one cyma to the other, which form the opposite angles, into nine equal parts; taking one for the height of the tympanum, and placing the height for the cornice above it, observing that the tympanum is measured from the top part of the fillet which covers the small cyma.

Between Vitruvius and Scamozzi there exists a medium proportion, which is given by Serlio: it consists in taking for a point of centre the half of the space, A, between each extremity of the cyma, forming the two two extremities of the cornice, B, marking it below by intersecting the perpendicular, C, of the centre; opening the compasses from this point to the extremities of the cymas, B, and describing a segment of a circle, passing through the upper part of the perpendicular line of the centre. The intersection D will give the height of the pediment, the cornice being also included.

In conclusion, it may be remarked that the proportion of pediments is subordinate to the climate, as well as to the order to which they are applied, and also to the extended or limited dimensions of their base. But as two extreme terms, their height may be varied from one-fourth to one-sixth of the length of their base.

A TABLE OF THE INCLINATION OF PEDIMENTS AND ROOFS, FROM ANTIQUE AND MODERN EDIFICES.

			Degrees
Antique Edifices.	Athens	Temple of Minerva	16
		Temple of Erectheus	15½
		Temple of Theseus	15
		Propylea	14½
	Rome	Portico of Septimus Severus	23
		Temple of Concord	23½
		Temple of Mars the Avenger	23½
		Temple of Fortuna Virilis	24
		Temple of the Pantheon	24
		Temple of Antoninus and Faustina	24½
Modern Edifices.	Rome	Roof of the Basilica of S. Paolo fuori delle mura	23
		Roof of the Academy of France. at Rome	23
		Roof of the Theatre D'Argentina	21½

INTERCOLUMNIATIONS, EQUALLY DISTANCED, FOR EDIFICES OF LESS IMPORTANCE, ACCORDING TO VITRUVIUS.

Corinthian order of six columns in front, five modules, or two diameters and a half, from axis to axis.

Ionic order of six columns in front, six modules, or three diameters, from axis to axis.

Ionic order of four columns in front, eight modules, or four diameters, from axis to axis.

Doric order of four columns in front, ten modules, or five diameters, from axis to axis.

Ionic order of four columns in front, six modules and a half from axis to axis; the centre one eight modules.

The Doric intercolumniations are governed by the vision of the triglyphs.

INTERCOLUMNIATIONS.

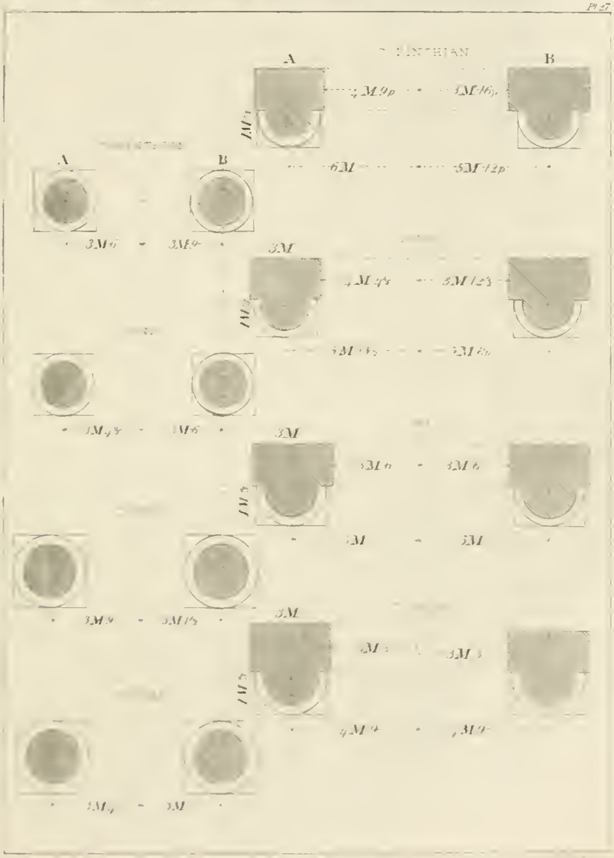
The plates 27 and 32, fig. A, present the distances which ought to be observed for each order between the axis of the columns of porticoes, and those applied to arcades, according to Vignola. Fig. B represents the intercolumniations arranged to one common axis, so as to facilitate their execution, when it is found necessary to employ them in the same façade. The plates 28, 29, 30, 31, 33, 34, 35, and 36, contain the elevations, drawn according to the proportions given in the plans, fig. B, plates 27 and 32.

APPLICATION OF COLUMNS TO ARCADES.

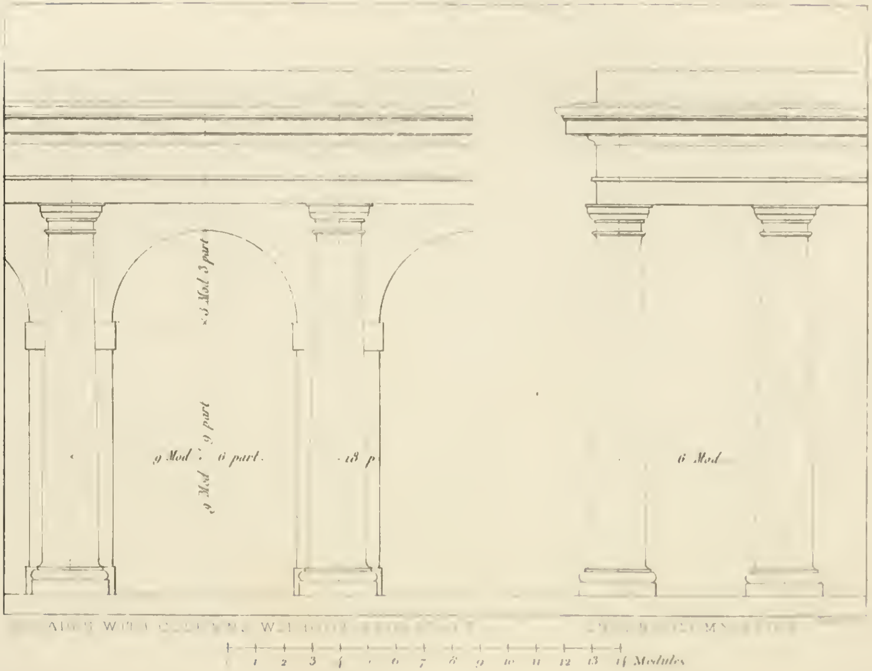
Arches have been more or less employed in modern architecture, according to the country and the nature of the materials which it furnishes. The difficulty of finding architraves of a single block from column to column, or of supplying it by the artifice of voussoirs, at the decline of the antique architecture, had suggested the idea of raising centres upon detached columns. Thence, doubtless, may be dated the employment of continued arches, which afterwards became so general in the construction of the interiors of spacious churches; which require solid supports for the weight of the vaulted ceilings, and materials destined to serve for their covering or roof.

But arches forming arcades, submitted to the proportions of, and decorated with, the several orders of architecture, as employed at the exterior of edifices,

PLANS OF INTERCOLUMNIATIONS & ARCADES WITH COLUMNS WITHOUT PEDESTALS.



TUSCAN ORDER



[illegible] WITH COLUMNS WITHOUT [illegible]

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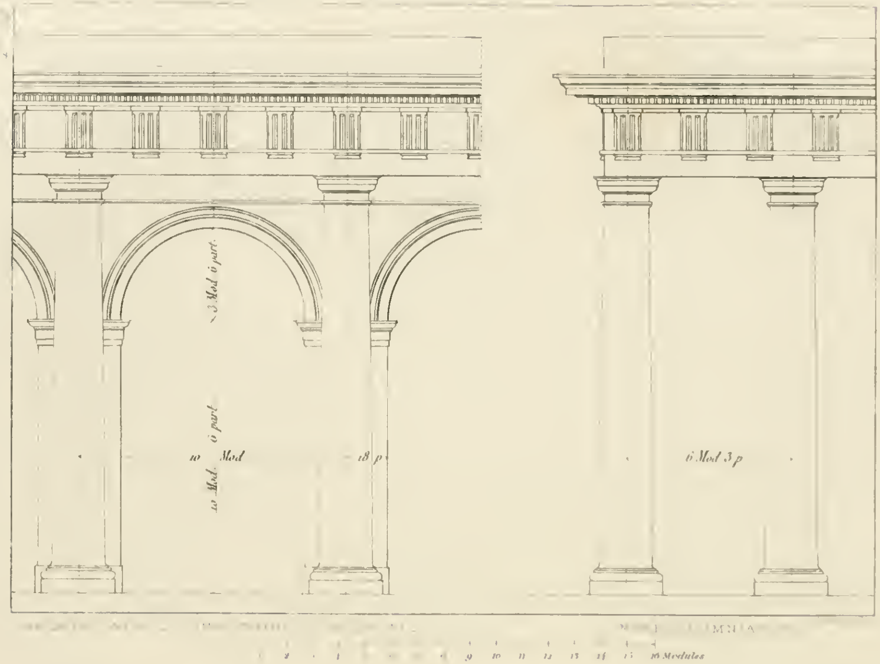
DORIC ORDER.



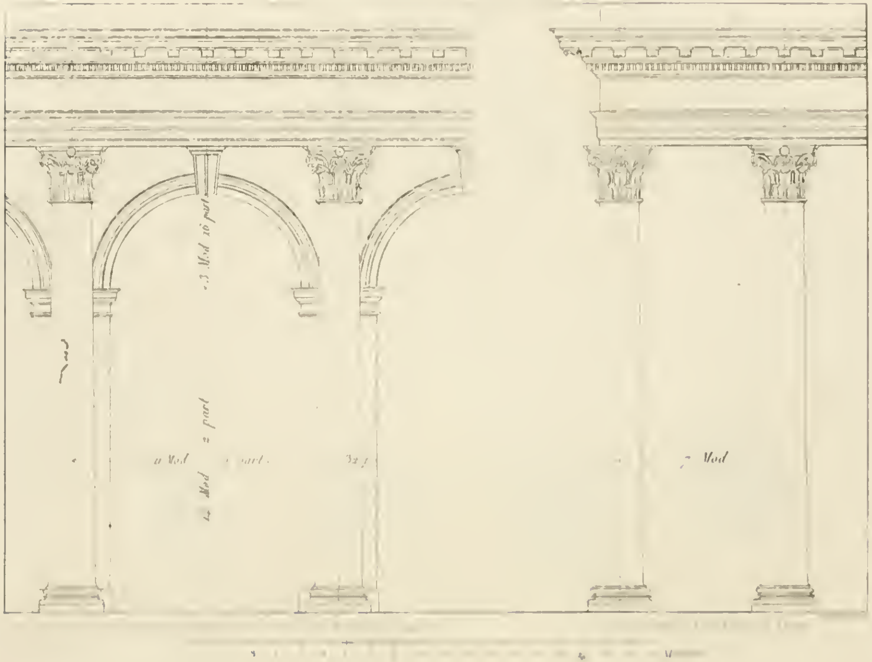
[illegible] Three Tun Passage [illegible]

IONIC ORDER.

ARCADES WITH COLUMNS WITHOUT PEDESTALS. INTERCOLUMNIATION.

[illegible] Jn. Bennett Three Tun Passage [illegible]

[illegible] ORDER



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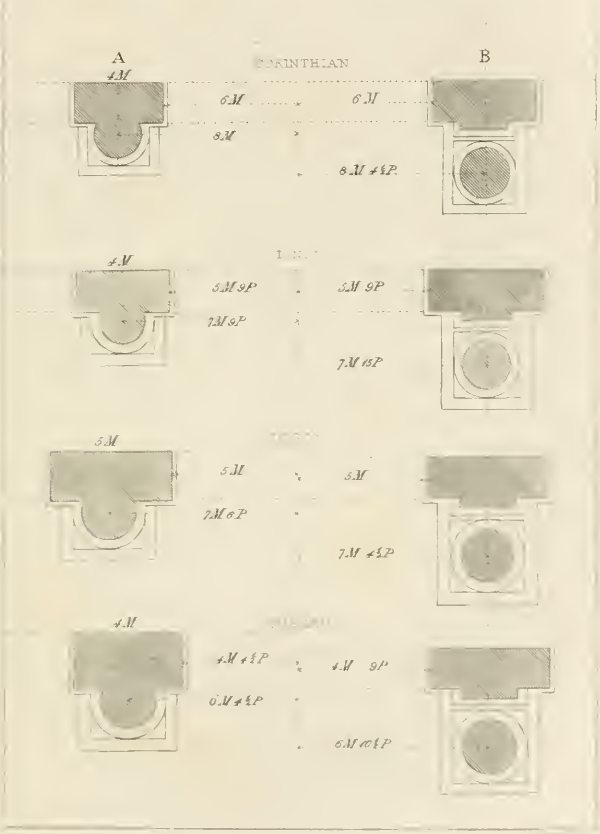
PLANS OF ARCADES WITH COLUMNS & PEDESTALS

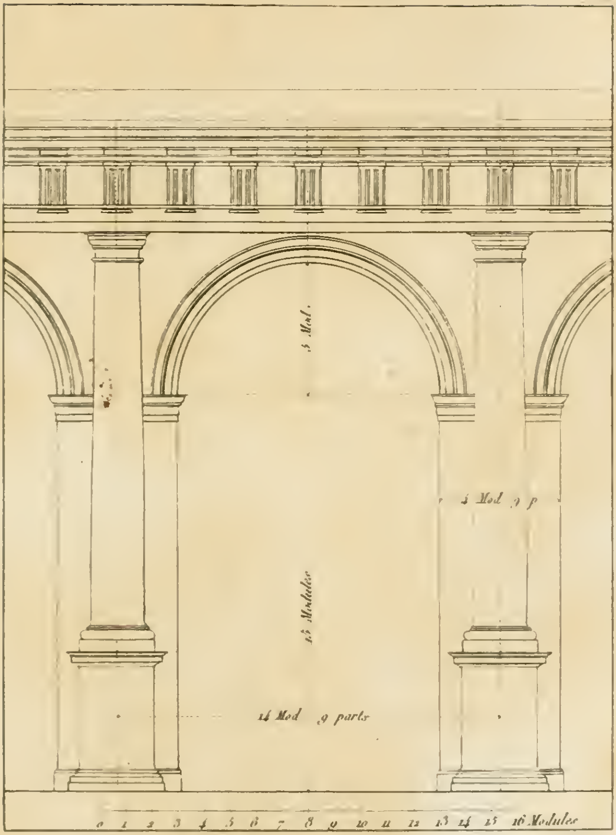


TUSCAN ORDER.

ARCADE WITH COLUMNS AND PEDESTALS.

London, Published for [illegible] Architectural [illegible]

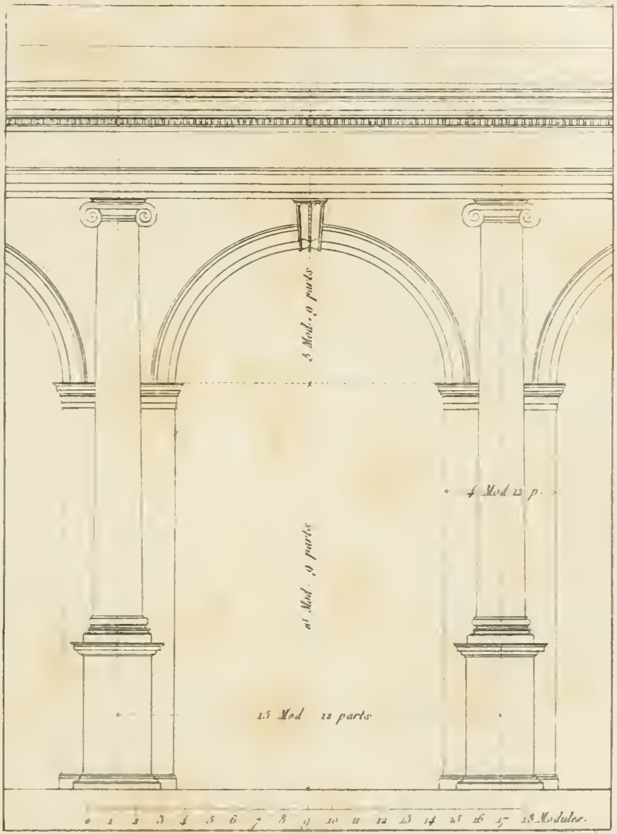
DORIC ORDER.


5 Mod.
5 Mod. 9 p
13 Modules
14 Mod. 9 parts
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 Modules

[illegible]

[illegible]

IONIC ORDER.



ARCADE WITH PEDESTALS [illegible]

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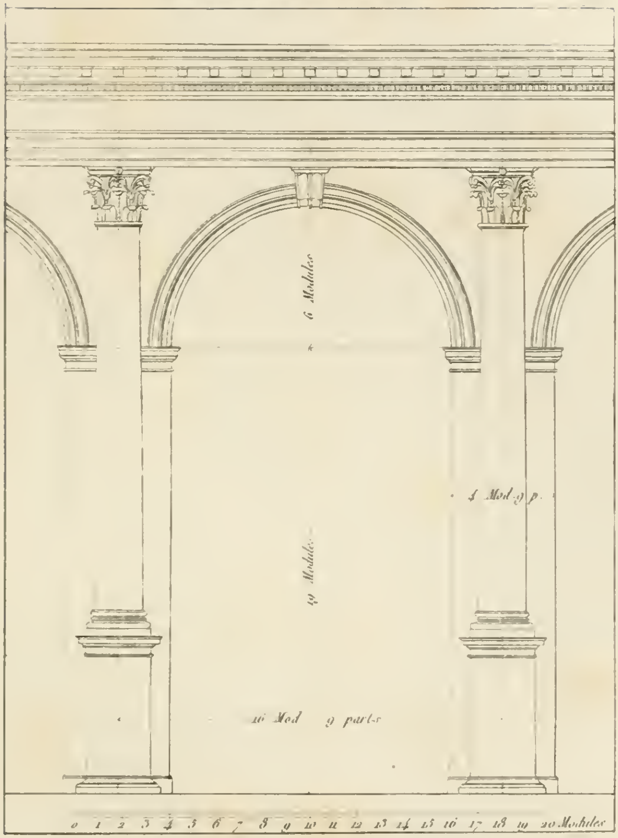
CORINTHIAN ORDER.



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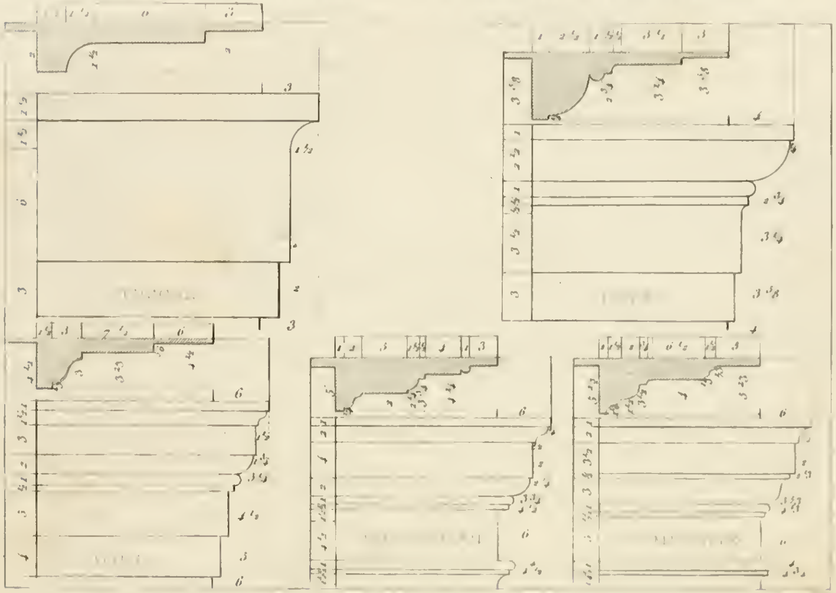
IMPOSTS AND ARCHIVOLTS OF THE FIVE ORDERS.



have examples in many remains of antiquity, such as the theatres and amphitheatres. They may be employed either with or without pedestals. The models just cited present applications of the last-mentioned mode in their first range, the columns of those above having pedestals, which are prolonged between the sides of the aperture of the arcades, and serve as balustrades.

The beautiful remains of the theatre of Marcellus, at Rome, of which there still exists a considerable range of arcades, has doubtless served as a model to the architects of the sixteenth century; and it is from this style and these proportions that both the interior and exterior of the greatest number of palaces were constructed. *See* TABLE, page 197.

The employment of arcades, considered as galleries, has become almost general in the courts of extensive palaces. Modern Rome presents many examples. Sometimes they are supported by two columns placed under the impost, instead of a pier or pillar; at others reposing upon pillars, and forming, round the cortiles, a covered walk, serving likewise as means of communication to the different apartments. The examples are too numerous to permit of being further cited, and the above may be considered as a tolerably correct type of the interior of all the great palaces in Italy.

Arcades, without columns, are particularly suitable for edifices which require a character combining strength with simplicity; and they may be judiciously employed at the exterior of buildings forming public squares or places, markets, &c., as is practised in Italy. There are many cities, where arcades are erected on both sides of the streets, so as to form a

cover to the causeways, which is productive of as much utility and comfort as of beauty.

There are again other examples of two ranges of arcades, with columns one above the other. Such was originally the immense interior of the court of the Vaticano, by Bramante; the apertures of which were afterwards obliged to be filled, to remedy the lightness of the construction. Such is also the beautiful court of the palace of the Cancelleria, by the same architect; which is composed of arcades of greater elegance, supported by columns of marble. At the head of these examples the court of the *loggie*, at the Vaticano, the architecture of Raphaello, must not be forgotten; which consists of three ranges of open galleries, the one above the other.

Amongst the most classical productions of this kind, is the interior of the court of Farnese palace, by Vignola; where the beauty of the proportions, forms, and construction, rivals any thing of the same kind ever executed. *See* Table.

The proportions of arcades decorated with orders of architecture vary according to the order applied, which determines the dimensions, forms, and taste. In the Tuscan, which the moderns have distinguished from the Doric by a greater appearance of simplicity, the arcade has no archivolt, and but a simple band for an impost. The same order with a pedestal has an architrave and impost, less simple than that without pedestal, which is the case with all the arcades of Vignola. *See* pls. 28, 33, and 37.

The Doric arcade is ornamented with an archivolt of two fascias, crowned with a few mouldings: the same mouldings are used in the impost. *See* pls. 29,

34, and 37. The Ionic arcade has ornaments less simple than those of the Doric, and is further distinguished by a key in form of a console. *See* pls. 30, 35, and 37. The Corinthian and Composite arcades have their archivolts and imposts still more ornamented. *See* pls. 31, 36, and 37. The proportions of these arcades are determined, as regards their heights, by those of the columns which are applied to them: thus the Tuscan arcade is the lowest of all, and the Corinthian the highest.

A COMPARATIVE TABLE OF THE RESPECTIVE RELATIONS IN THE HEIGHTS OF COLUMNS WHEN EMPLOYED ABOVE EACH OTHER WITH ARCADES IN THE SAME FACADE; TAKEN FROM THE MOST CELEBRATED ANTIQUE AND MODERN EXAMPLES.

		Theatre of Marcellus, at Rome.			*Colosseum at Rome.*			*Barbarini Palace, at Rome.*			*Farnese Palace, at Rome.*		
		Height of the Parts.			Height of the Parts.			Height of the Parts.			Height of the Parts.		
		Feet.	Inches.	Lines*.	Feet.	Inches.	Lines.	Feet.	Inches.	Lines.	Feet	Inches.	Lines.
Corinthian	Entablature	....	....	....	6	7	3	4	7	2	....	....	....
	Column	....	....	....	25	7	....	20	9	6	....	....	....
	Pedestal ..	....	....	....	6	4	9	4	5	....	....	....	....
		-	-	-	38	7	-	29	9	8	-		-
Superior and inferior diameters of the columns ..		-	-	-	2	7	11	1	11	10	-	-	-
					2	10	10						
Ionic	Entablature	6	4	2	6	7	5	4	9	5	4	11	7
	Column	23	6	2	25	8	9	21	6	4	19	6	1
	Pedestal ..	4	....	5	6	11	5	3	8	2	3	8	2
		33	10	9	39	3	7	29	11	11	28	1	10
Superior and inferior diameters of the columns ..		2	2	3	2	5	....	1	9	10	1	9	4
		2	7	4	2	10	10	2	2	7	2	1	9
Doric	Entablature	6	2	5	6	6	7	5	3	3	5	4	9
	Column	24	11	4	27	8	9	22	11	7	22	6	4
	Socle	1	7	2	2	5	....	1	6	1	1	4	0
		32	8	11	37	8	1	29	8	11	29	3	1
Superior and inferior diameters of the columns ..		2	6	7	2	8	2	2	3		2	4	8
		3	2	1	2	10	10	2	7	4	2	8	4

When columns are employed above each other, the same line of axis is generally observed. For the intercolumniations and proportions of the apertures of the arcades, see the Tables and Plates of the Orders.

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* The line employed in this work is the twelfth part of an inch

OF RUSTICS.

There are but few examples of rustics or bossages preserved amongst the antiquities of Greece, besides those employed in the basement of the choragic monument at Athens. The grooves are little sunk, forming compartments that express a greatness of division. The same species (*see* pl. 50, fig. 7,) have often been suitably employed in a great number of the ancient edifices erected in the Roman empire. The mausoleum of Cecilia Metella, which is circular in its plan, presents them at its exterior. This style was introduced into almost all the edifices erected at this period, of which the temple at Nismes, named the Maison quaree presents an example, the walls of which are exteriorly wrought after this manner.

This style is employed with much discretion and judicious arrangement in the antique edifices of Italy. They generally present themselves in walls serving as inclosures to edifices, which is doubtless where they are most suitable; and in basements, or any part which occupies the situation of a support. The most admirable example of this style, is the immense wall that incloses the forum of Nerva. Others are found at the aqueduct of Claudius; and at the arch of Drusus, which supports a portion of the canal of the aqueduct. There are rustics of a similar description employed in the amphitheatre of Verona, and that of Pola, in Istria. Rustics should never divide or interrupt the face of columns or pilasters, whatever may be the authority for this practice; such examples, as that of Verona, furnish sufficient proofs of an absurdity which ought not to be imitated.

Florence was the first city, at the commencement of the restoration of the arts, that presented examples of an erroneous and confused application of this style; which became more temperate as the art advanced to its revival, at which time it was adopted in different parts of Italy, where it was employed more sparingly, and with greater judgment. Thence it was introduced into the different cities of Europe, where it has been employed in greater or less profusion. For examples of their employment, form, and proportion in basements, arcades, &c., *see* the different elevations, commencing with pl. 56. Rustics and bossages, when judiciously arranged and appropriated, produce in edifices an agreeable effect. They characterize the different parts, distinguish the masses, and serve as shades of expression. Sometimes they are employed to produce relief to the pilasters, or to give a value to the parts left plain; at others to vary the effects of plans by means of their increased or decreased application; so as to render the parts more lively or serious, light or heavy, according to the character required to be expressed, and which is effected by means of their divisions.

Pl. 50, fig. 8, presents an example of those suitable for quoins; their angles are of 45 degrees; which produce a soft shadow on the upper, and a strong opposition on the lower face, by which they are separated.

OF DOORS.

The style of decoration, and the proportion of the doors which serve as entrances to public edifices, are naturally connected with that of the orders with which they are employed. Vitruvius has made mention of those suitable to temples only, of which he distinguishes three kinds; the Doric, Ionic, and Attic or Corinthian doors; the soffits of which form right lines. Their difference consists in some variety in the proportions and in the details, for the purpose of adjusting them to the columns forming the peristyles of the antique temples. But that which agrees with a more general and usual theory is, that he prescribes that the profiles of the architrave and crowning members of doors be conformable to the character of simplicity or elegance which characterize each of the orders. Thus the antepagmenta, or architrave of the Doric door, is composed of a very simple band. That of the Ionic has an increase of mouldings, together with crowning members. The Attic door nearly resembles the last-mentioned, except that the jambs are a little inclined; but this would be an inadmissible caprice at the present day. These rules, given by Vitruvius, as before observed, were peculiar to temples; but their principle is founded on the harmony which the style of architecture, expressed in each order, ought to prescribe to the parts that enter into the composition; of which the order is the regulator. Admitting for a moment, as was the case at the period of the revival of the art, that there are five orders,

which have been reduced to three by judicious examination; it results from the observations of most modern authors, that the doors of the order named Tuscan (which, together with the four following, are in this instance supposed to have semicircular heads) ought to have twice the width of the aperture in height; those of the Doric, twice and a sixth; those of the Ionic, twice and a fourth; the Corinthian, twice and a half; and the Composite, twice and a third.

The proportion of doors with platbands or straight heads, is determined by dividing the width of their apertures into twelve parts; giving twenty-three for the height of the Tuscan doors, twenty-four for the Doric, twenty-five for the Ionic, twenty-six for the Corinthian, and twenty-five and a half for the Composite.

But the general proportion given to doors is twice the width of their aperture in height, as fig. 2, pl. 50; one-fifth to a sixth of the width of the aperture for the breadth of the architrave, and one-third to one-fourth of the height for the distance from the soffit of the architrave to the summit of the cornice, that is, from B to A.

This theory relative to the dimensions of doors, has, as may be easily discerned, no other object in view than to make the apertures of edifices partake of the measures assigned to the proper character of each order. Whence it results that similar measures are not geometrically fixed; as it is the judgment alone that is capable of making suitable applications, and determining the different relations that doors ought to bear with their intended situation. For examples of

their various forms, proportions, and style of decoration, *see* the elevations and sections commencing with pl. 56.

Pl. 40 presents the general proportions, together with the details of the exterior door under the portico of the Pantheon, at Rome. The aperture is a little less than twice its width in height, having the same width at the upper as at the lower part.

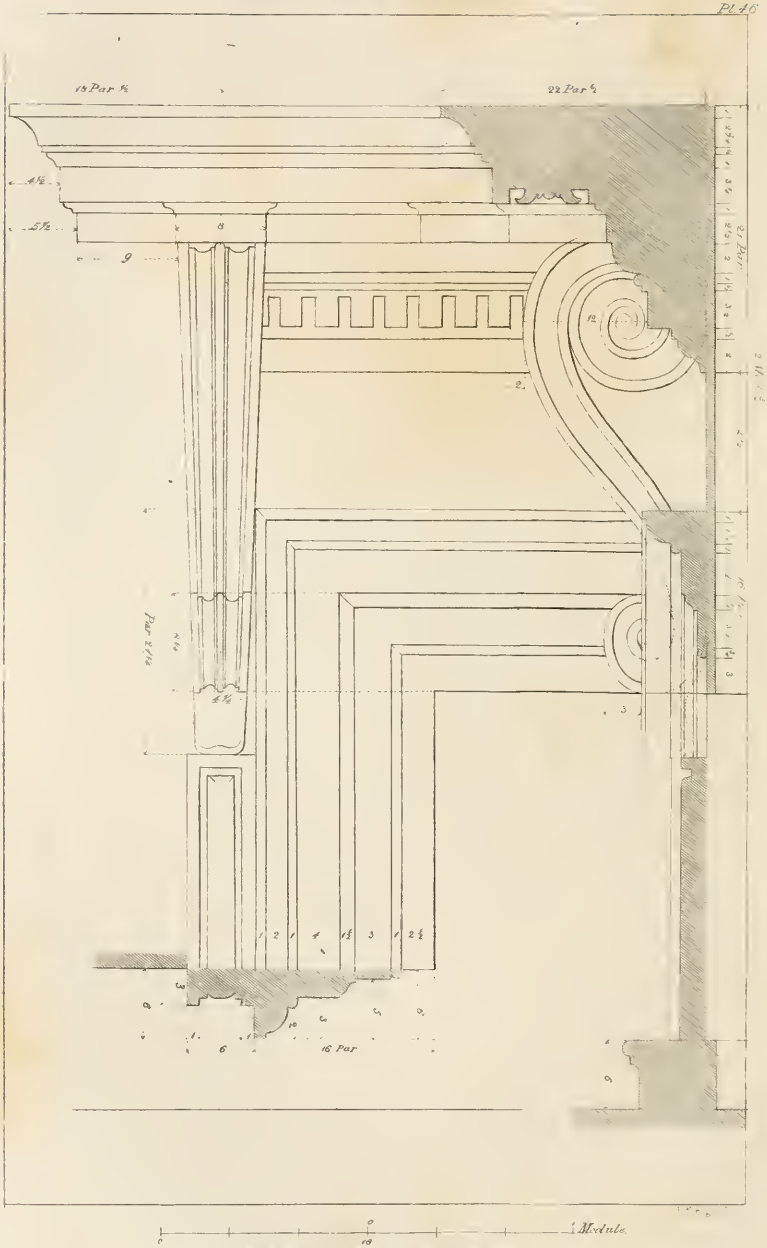
In presenting the following plates of doors, from the designs of Vignola, as the most perfect models of their kind, it has been judged necessary to suppress any irregularity of detail which they offered, whether caused by the custom of the period, or the situation in which they were executed; such, for example, as the key-stones of the rustic door interrupting the architrave and frieze. In the Doric door, a second plinth under the bases of the columns, apparently placed there to gain more height in their arrangement; as likewise the projection of the horizontal architrave of the door, beyond the exterior sides of the vertical ones. In the two examples of Corinthian doors, the last-mentioned license is suppressed, together with that of a curved frieze; and any similar errors that the original designs, which have been consulted for the formation of the plates for this work, contained, have also been suppressed; taking the greatest care never to affect the spirit of the former, but to enable them to be offered as the best and purest models for imitation.

The rustic door, pl. 41, presents simplicity and regularity of character, which gives a value to the composition.

The Doric door, pl. 42, is given by Vignola as

DETAILS OF A DOOR.

Pl. 46

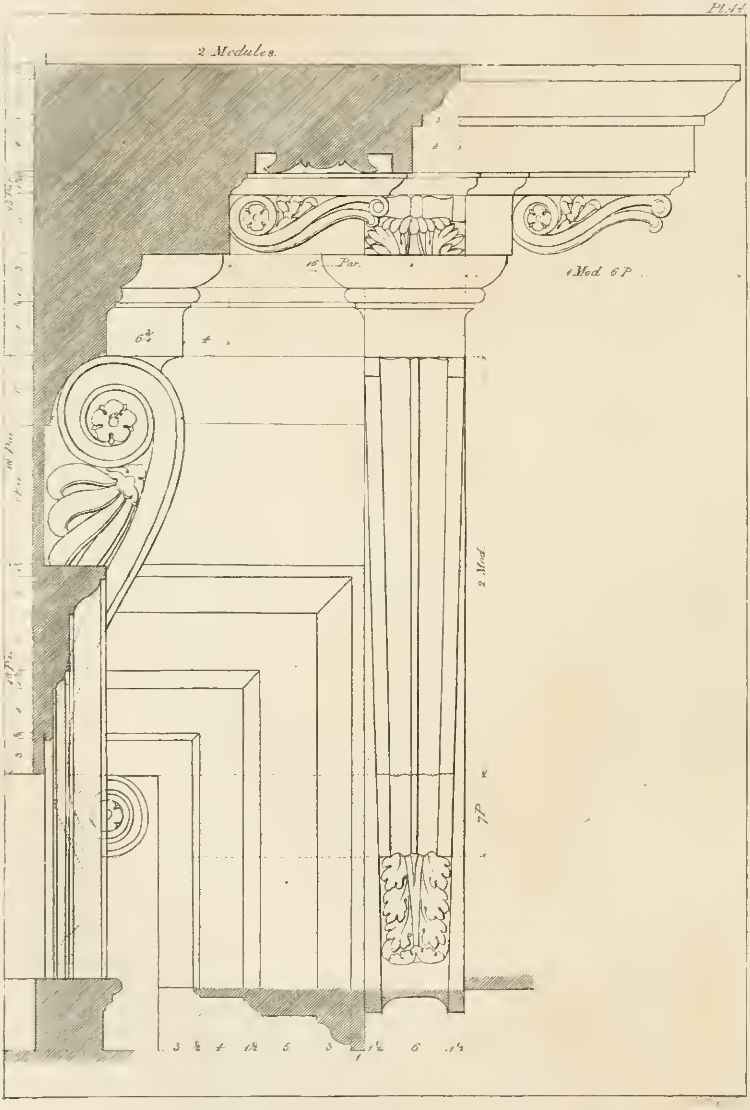


London Published by [illegible] Architectural [illegible] John [illegible]

DOOR

[illegible] Tun Passage Paternoster Row

DETAILS OF A DOOR.



AT S. LORENZO IN DAMASO, AT ROME.

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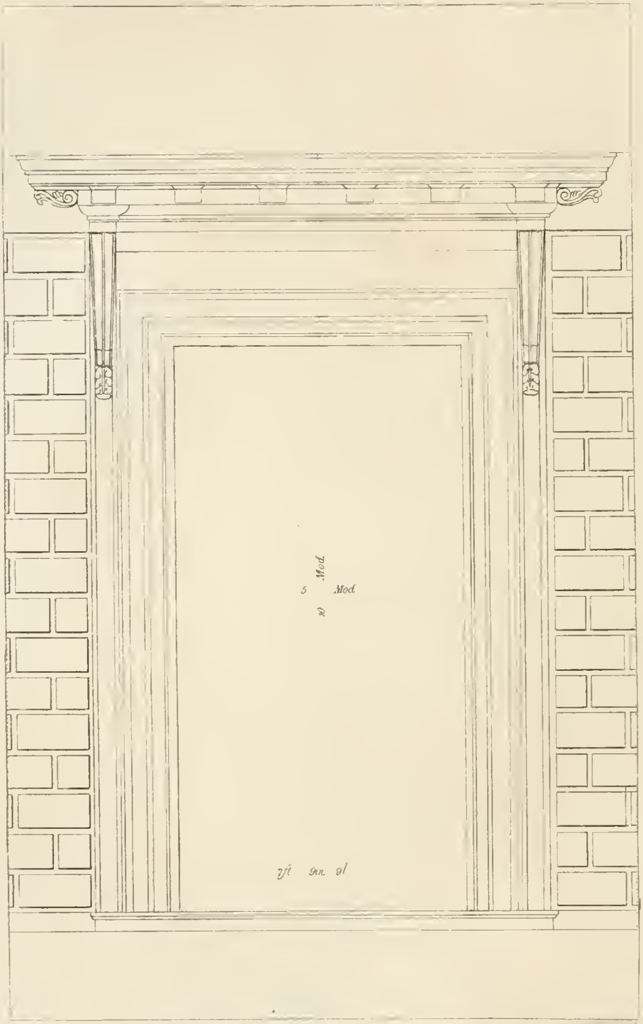
DOOR.

P. 4.



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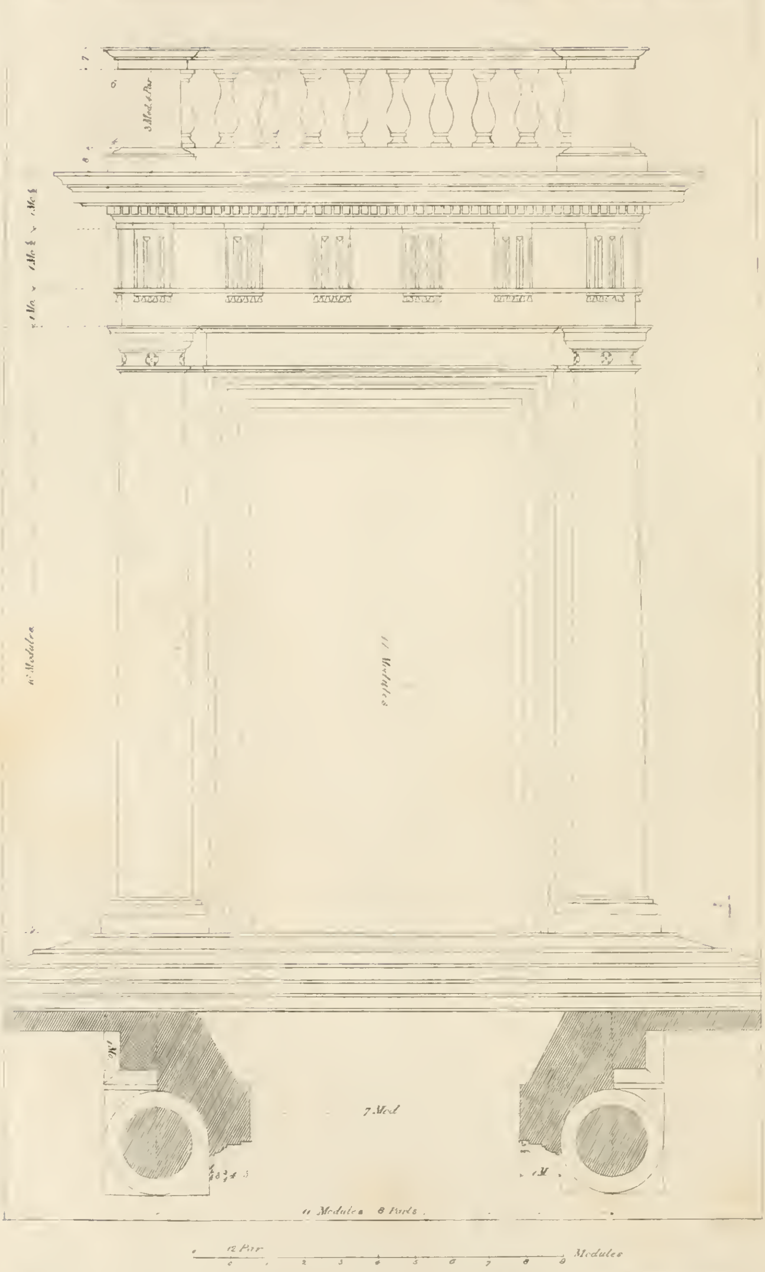
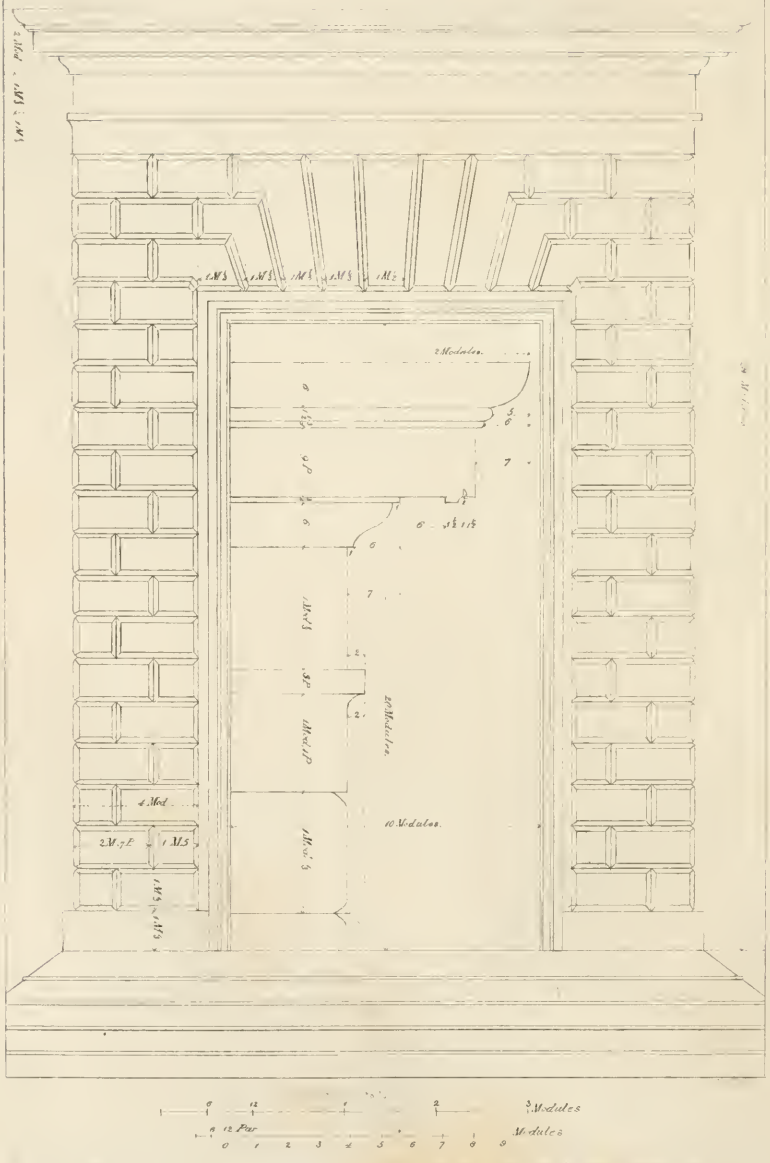
DORIC DOOR



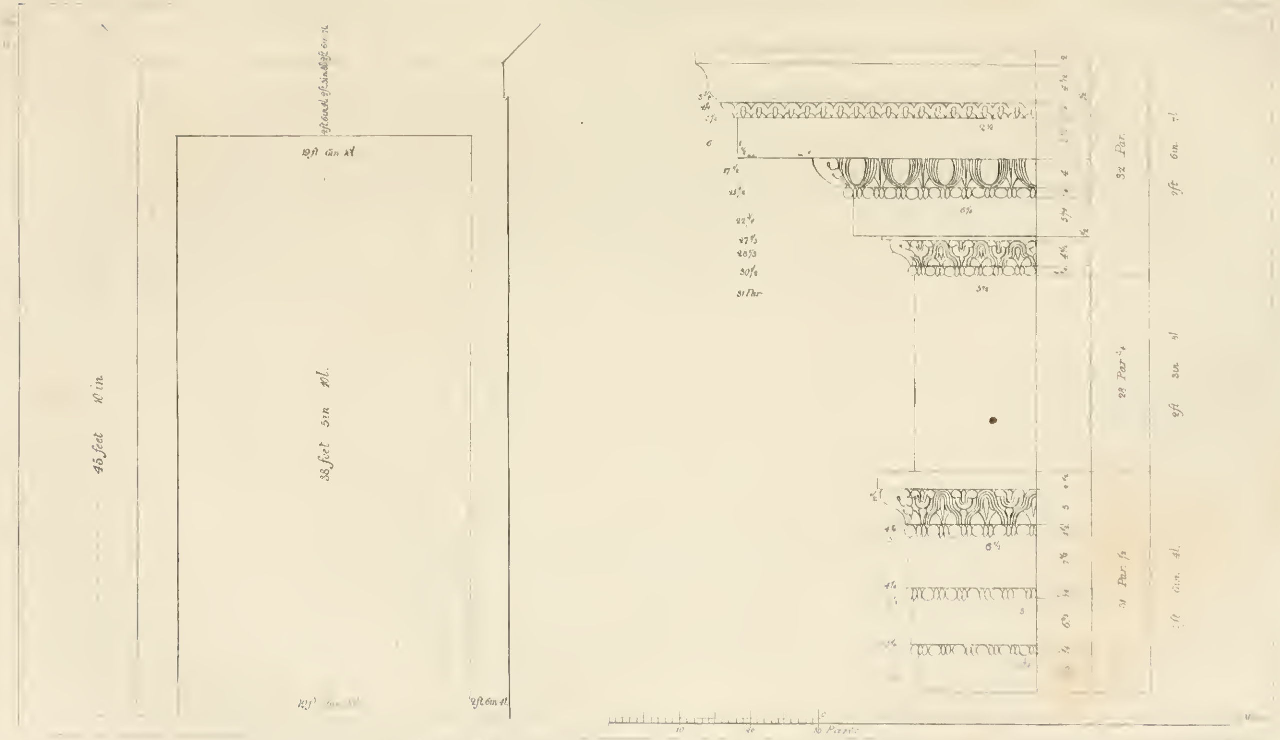
London Published For Billington's Architectural Director by John Bennett Pater [illegible]

RUSTIC DOOR.



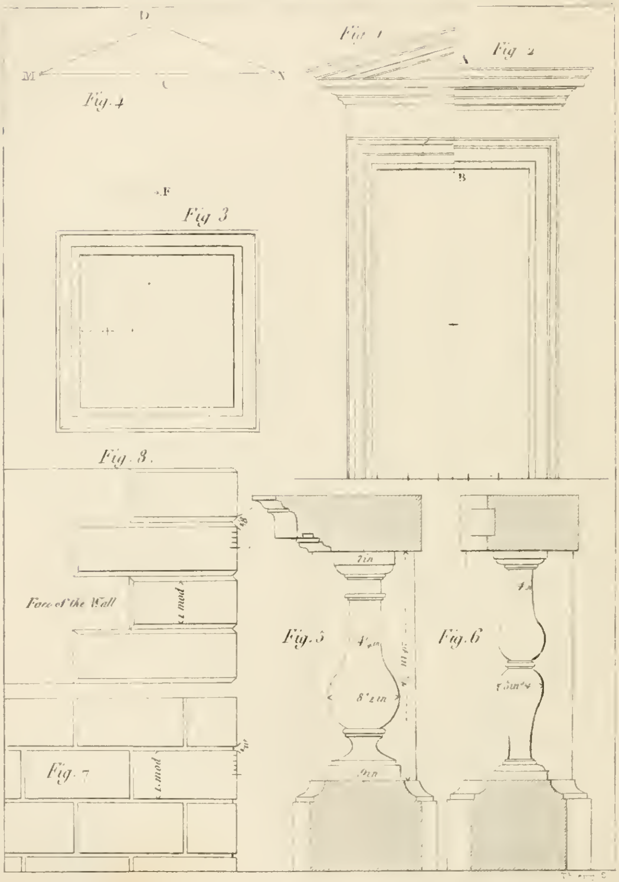
London Published for J. Billington . Architectural Director by John Bennett Three [illegible]

DOOR.



[illegible] OF THE PANTHEON [illegible] ROME.

DOORS, WINDOWS, BALUSTERS & RUSTICS



Published for Billington's Architectural [illegible] Bennett [illegible]

having been designed for the Cancelleria palace. It would be difficult to imagine any thing more simple or better arranged than this example; which offers nothing forced, all the parts of its composition appearing naturally placed. The order which forms its decoration is taken from his denticulated Doric. The continuation of the astragal between one column and the other, gives a finish to the horizontal architrave, that produces a good effect.

The door of S. Lorenzo, in Damaso, pls. 43 and 44, may be considered as forming the principal entrance of an edifice, and is a valuable model of its kind. All its proportions are well preserved, and in good relation with each other; and it is susceptible of being enriched by the application of ornaments to its mouldings, according to the character of the edifice to which it is intended to be applied.

The door of the saloon of Farnese palace, pls. 45 and 46, offers the same excellences as the foregoing example; with this difference, that the former was intended for exterior, the latter for interior decoration; having the general and detailed proportion of their parts regulated accordingly.

OF WINDOWS.

Of all the parts of an edifice, the windows have the most immediate relation with the interior distribution. To disregard all but external decoration, and to neglect the relation which ought to exist between the

exterior and interior of an edifice, would at best produce a very defective structure. The first duty being to satisfy the laws of symmetry, the windows, which form a part in the regular ordonnance at the exterior, should be conformable to the interior of each apartment; so that the piers be of an equal proportion, and the spaces be symmetrical and corresponding in the saloons, apartments, cabinets, &c. Without this discrimination, the art of distribution, and also that of architecture, would return to that state of infancy and barbarism, which characterizes the edifices erected from the fourth to the fifteenth century; during which period light was admitted into the different apartments through apertures, the distribution of which did not bear the least external relation to each other.

As symmetry at the present day holds its due rank in the ordonnance of buildings and edifices, distribution has become an art that requires the highest degree of judgment in those who wish to profit by all the resources of which the art is capable. It is not sufficient to observe that all the windows be placed perpendicularly over each other, but that there also exist a relation of proportion between them. It is for this reason that in buildings of any importance, blank or imitation windows are often employed, above, below, at the side, or directly opposite those which are known to be necessary; in order to preserve the laws of symmetry in the exterior of their façades. Vitruvius, Palladio, Scamozzi, and many other architects, have variously treated the proportions of windows. Their opinions must necessarily differ, according to the custom of the countries treated on in their writings. Nothing effectively admits of greater variety, accord-

ing to the climate, degree of temperature, duration of light, purity of the atmosphere, commercial occupations, customs, and the wants of society, than the apertures by which light is admitted into the interior of apartments.

In warm climates, windows are few in number, and small in their dimensions. According as we advance towards those countries where the sun has less power, and the winter season is of longer duration, it may be remarked, that the windows are employed so as to derive all possible advantage from the light.

If windows are, of all the parts of edifices, those which are the most governed by the laws of necessity, it is no less certain, that notwithstanding these imperious reasons, they are also susceptible of receiving from the art the most harmonious relations.

An edifice may be considered exteriorly as a composition of planes and apertures, independently of the wants and conveniences of the interior. There are some laws prescribed by solidity, and others that propriety and a perfect accord of the parts, render evident to all who are exercised in the research of this description of beauty.

For example, solidity prescribes that the piers between windows be at least equal to the breadth of their aperture. In countries where it is customary to give to piers but one-half or one-third of the breadth of the opening of the window, it must be evident, from the aperture exceeding the plane, that the construction must be weakened; and consequently the buildings must require more frequent repairs. In other countries, where it is customary to give to piers twice the width of the aperture of the windows, the

houses present a massive and serious appearance, which is inconsistent with their character. For good effect in architecture, it is, however, better to fall into the last-mentioned excess than the former. The greatest evil in all constructions is a want of solidity, and the appearance alone of this defect is almost as great a fault as when it exists in reality.

The medium term for the proportion of windows consists in giving them twice the width of their aperture in height, as in pl. 50, fig. 1; where the breadth of the antepagmenta, or architrave, is a fifth, and may be employed from this to a sixth of the width of the aperture. The height of the entablature, from the soffit of the architrave to the upper fillet of the cyma in the cornice, may be from one-third to one-fourth of the height of the aperture. The architrave and frieze should be equal in their height; and the cornice may be augmented one-fifth or one-sixth, but rarely one-fourth more than the height of the two other members, according as it may be judged necessary for its character and effect. This rule has generally been adopted in the most celebrated edifices at Rome and Florence. These proportions, however, vary according to the nature of the stories. Windows of the ground story are generally reduced an eighth part less in their height than double their width; whilst those of the superior story receive an eighth, and sometimes two, more than the lower story; and the heights of the windows in the stories above gradually decrease according to the width of their apertures.

In the distribution of windows in the parts in advance, and those in retreat of a façade, it ought

always to be observed, that one should occupy the centre, or that they be of an uneven number; it being much more consistent for an aperture to be in the centre of the different divisions of all façades than a pier. Notwithstanding the examples in which this rule has been neglected, it ought in general to be regarded as inviolable; except in private dwellings, where the total is subordinated to the irregularity of the site, and the necessary wants and conveniences, which renders it impossible to follow the rules of an exact symmetry.

The distribution of windows is not confined only to the relation of the horizontal position of their ordonnance in a story; there is another relation no less important, which is that which regulates their intervals and correspondence from one story to another. As an edifice is displeasing to the sight in which there is too great a portion of aperture, or when the openings exceed the surface of the piers; so in like manner it is repugnant to solidity, and also to correct taste, to separate the stories only by a trivial intervening space. There ought to exist between the inferior and superior stories, a space which indicates not only the thickness of the floor, but likewise a space necessary to make the sill of the window serve as an easy support. In this respect, the windows which have their sill as high as it is convenient in the interior of an edifice, give to the exterior a more happy distribution. This part of architecture, however, is subordinate to the manners of the nation in which it is employed. Windows amongst the ancients only served to admit light into their apartments, and not to render the view into the street their principal object; therefore the inter-

vening height of the space between the head of one window to the sill of the window immediately above it, was very considerable. Nothing can be more favourable to good effect in architecture than this: whether the walls be plain, or decorated with an ordonnance of columns or pilasters.

It is impossible to give precise rules for the distribution of windows in the interior of apartments. The only one is to follow symmetry. By this is meant the most exact correspondence between the intervals or piers which separate the windows, as also their uniform repetition in such apartments as occupy the whole breadth of a building.

The principal difference in the forms of windows, consists in the diversity of their apertures: amongst which are those which serve as doors, and those that serve only as windows. The first are employed in the ground story, and have ordinarily the form of arcades; though sometimes they are employed with horizontal or straight heads.

Of the second description, or those which serve as windows only, there are three kinds; namely, those with semicircular heads, those that have their soffit or head straight, and those in which it forms the segment of a circle.

Semicircular windows are only employed with success in large masses of buildings, of which the edifices at Florence present us many fine examples. They are also often employed in churches that require very large apertures.

Windows with straight heads are those most generally used; being the least expensive in their construction. (*See* pls. 50, fig. 1, and pls. 47 and 48.)

Segmental windows are the least elegant in their form, being an equivocal medium between the two former.

Semicircular-headed windows, when employed in the ground story, often serve also as doors. They are generally employed to admit light into vestibules, and at the same time to serve as their entrance ; as also in large saloons, galleries, or any other extensive apartment. Those that are placed at the exterior of a façade, whose decoration requires the same ordonnance, ought to correspond in their base or plan with the arcades that ornament the other parts of the edifice. (*See*, for the respective proportions of the arcades belonging to each of the orders, when employed without pedestals, pls. 27, 28, 29, 30, and 31.) This description of windows may likewise be employed in the second story of an edifice ; in which case the columns forming their decoration, if any be employed, may have pedestals, and the intervening spaces be occupied by balusters. (*See* arcades with columns and pedestals, pls. 32, 33, 34, 35, and 36 ; their impost and archivolts, pl. 37 ; and the balusters, pl. 50 ; fig. 5 and 6.)

When the dimensions of some of the apartments in such buildings do not require or admit of openings so large as those of the aperture of the arcades, these latter are feint, leaving such a proportion of aperture as is necessary for the admission of the light required in the interior. If the form of the head of the window so situated be semicircular, it ought to have the same point of centre as the arch of the arcade; if it be straight, and employed with a cornice, the upper member of the cornice ought to be equal in height to

that of the impost; if the aperture be plain, it ought likewise to extend to the height above-mentioned. To proportion these windows to their restricted width, it is necessary to raise them upon a plain continued pedestal, balustrade, or elevated string-course; the feint arcade being employed only when essential to the symmetry of the general ordonnance of the rest of the façade.

Mezzaninas are stories of low dimensions, employed in Italy, and generally placed between two loftier ones; sometimes between the ground and second story, and at others between the second and third story, which serve as small apartments for winter, for wardrobes, or as chambers for servants. The part where these can be employed with the greatest propriety, which in other respects are generally to be condemned, is in the basement story, when it is not intended to be employed for any particular purposes; as also in different situations in commercial buildings, and private habitations of less importance. Light is admitted into this description of rooms by means of small square windows, (*see* pl. 50, fig. 3,) whose apertures are equal in width and height, and divided into six parts, one of which determines the breadth of the architrave.

If an architect be not always at liberty to appropriate the form, proportion, and disposition of windows, to the general character of the ordonnance of an edifice, this is not the case with regard to their decoration. There are many degrees of character, from the naked window finishing with the face of the wall, to that where the architrave is employed, on the mouldings of which are sculptured the richest orna-

ments. Windows without architraves ought never to be employed but in private houses, where architecture and art are no way connected; or in such extremely simple parts of edifices as do not admit of embellishment. It is in the degree of richness or simplicity of the architraves of windows that means may be found, which will conduce to give to edifices the particular expression that marks their uses.

The Doric order, in presenting a masculine character repugnant to all delicacy of decoration, does not necessarily demand a total exclusion of ornament. Harmony requires that all edifices which present this expression, be accompanied in the different parts which enter into the ordonnance, by profiles and ornaments exhibiting a similar character. Many examples present themselves in the Florentine architecture, that may be proposed as models for this description of windows.

The manner of decorating windows after the rustic style of ordonnance, consists in surrounding them with bossages or rustics, of more or less projection, roughness, &c., according to the degree of strength or rusticity required to be expressed in the general mass. The edifices of Tuscany present imposing and almost terrifying models of this style; which can rarely be judiciously employed, and only in extensive edifices; on which occasions, if an ordonnance of columns is employed, the architraves of the windows ought to be plain and unbroken, and to present a character of strength consistent with the style adopted.

The Ionic architraves ought to exhibit more elegance than richness, and to follow a progression of form, as also of ornament. Windows of the Ionic ordonnance

may present an entablature without pediment. (*See* pl. 47.)

All the delicacy and richness of form, proportion, and decoration, are reserved for the windows of the Corinthian ordonnance, as in pl. 48; which presents an example decorated with an entablature and pediment, supported by columns, having composed Corinthian capitals. The pediment may be traced as in pl. 50, fig. 4; by taking for a centre the point C, which is half the distance between each extremity of the cyma, MN, intersecting the vertical line below at F, with a radius of CM; afterwards placing the point of the compasses at F, and extending them to M, describe the arc MN, whose intersection at D will determine its height; or, according to the method given by Vitruvius, by dividing the whole length between the two extremities of the pediment into nine equal parts, and taking one of these divisions for the height of the tympanum. (*See* pl. 26.) For numerous examples of the form, proportion, and decoration of windows, *see* the different elevations and sections, commencing with pl. 56.

OF BALUSTERS.

THERE are no examples of the employment of balusters amongst the ancients. Their origin can only be assigned to the different fences or parapets executed in wood, and employed in situations not requiring other or more expensive materials. Modern architec-

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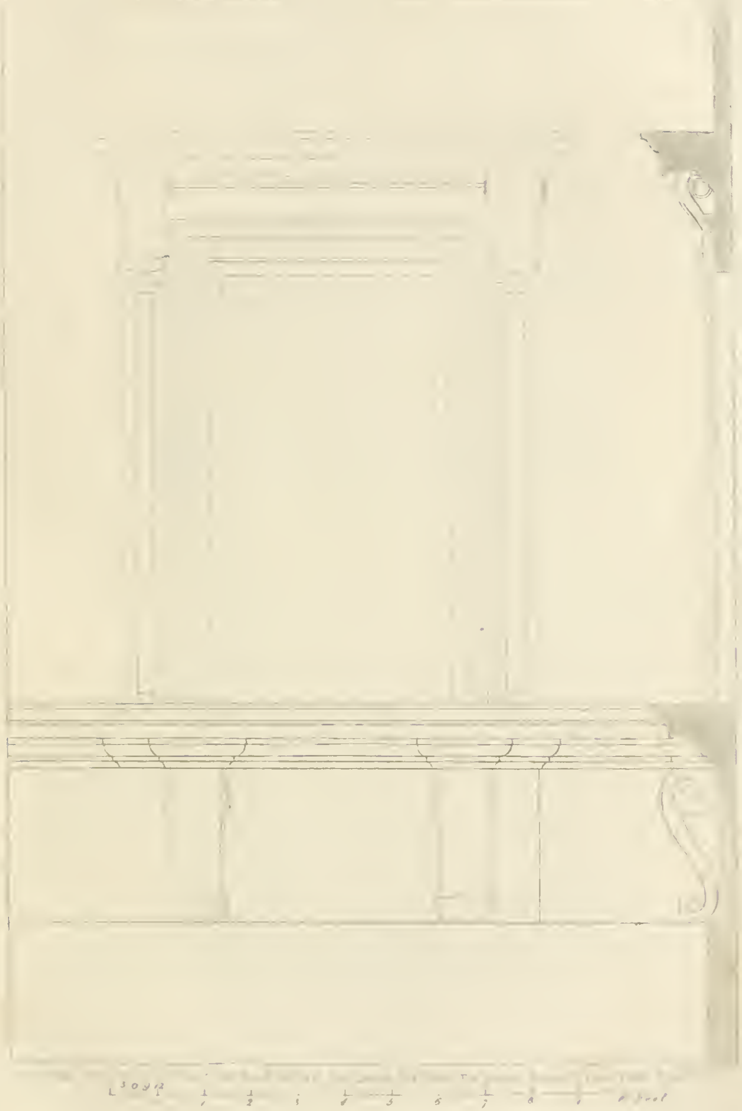

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ture has not only adopted and imitated these forms in stone and marble, but has likewise given to each different proportions, according to those of the order, which they are intended to accompany.

The earliest productions of balusters are those executed at Florence, and a few other cities in Italy; which take their date from the first centuries of the restoration of the arts, and represent small columns. This method, though puerile, is perhaps better than that which custom appears to have confirmed. Modern balusters present no other reason for their peculiar forms than caprice.

Balusters are ordinarily a species of column, occupying the place of the die in a continued pedestal, composed of three principal parts, a capital, shaft, and base; which, when placed upon a socle, and surmounted with a cornice, forms what is termed a balustrade. Balusters, as also balustrades, should partake of the character of the edifice in which they are employed. They are best situated when placed between the sides of the apertures of arcades, above the ground story, or between the pedestals of a range of columns forming a gallery; in balconies, staircases of important edifices, enclosures for altars, thrones, state-beds, &c.; and not upon the entablature of buildings or edifices, except when their roof is constructed in the form of a terrace.

Balusters should be of an even number, never admitting the half of a baluster at the extremities of each range; and the distance which separates them between their greatest diameter should be equal to one-half of that diameter, so that the aperture may be equal to the plane. There are five species of balus-

trades: the socle of the Tuscan is plain, and the cornice is an even face, surmounted with a fillet; its baluster is massive in its proportions, and has few mouldings. The Doric is lighter and more ornamented; and the other three species present a similar gradation. The proportions and mouldings of the cornice and socle are governed by those of the pedestals of the different orders.

To find the general heights of balusters, divide the die of the pedestal, which will be the height of the baluster, into five parts, one of which will give that of its base, dividing the remaining four parts into five, one of which will determine that of the capital. Again divide the space between the capital and base into five other parts, three of which will give the height of the neck, and two that of the swell. The plinth should be one-third of the height of the base, and the abacus one-third of that of the capital. These are the general proportions common to the five species of balusters; the number of their mouldings, their expression, the outline or swell of their shafts, the elegance or strength of their forms, being governed by the order to which they belong. The Tuscan baluster is of the greatest diameter, has the least number of mouldings, and is generally square in its plan. Its height is divided into five parts, two of which are given for the diameter of its swell. As the Corinthian baluster ought to present a degree of elegance, its greater diameter is but a third of its height; the Doric, Ionic, and Composite balusters, have the same comparative proportion. For example, if the height of the baluster be divided into sixty parts, the greatest diameter or swell of the Tuscan should be twenty-

four of these parts; that of the Doric twenty-three; that of the Ionic twenty-two; and those of the Corinthian and Composite twenty-one. Each of these diameters should be divided into two equal parts, one of which will give the diameter of the collarin of the capital, scotia of the base, and the lesser diameter, or upper part of the shaft; that of the plinth of the base is equal to the greater diameter of the shaft, and the abacus of the capital one-fifth or one-sixth part less.

In the employment of balustrades to principal staircases, care should be taken always to preserve the horizontal position of the mouldings of the balusters, making the inclination, caused by the stairs, in the heighth of the plinth of the base and the abacus of the capital. As to the number of balusters that should be employed between any two solids or planes, namely, between pedestals and sides of apertures, it should never exceed twelve, nor be less than four. The figures 5 and 6, pl. 50, may serve in some degree to illustrate the general expression of the two extremes in balusters, that of strength and lightness. For examples of their employment and form, *see* the different elevations and sections which follow.

OF NICHES.

The employment of niches, when considered as to their primitive form, is of the highest antiquity; but their employment as an object in architectural decoration is much less ancient. The Greeks gave the first proportion to niches, according to their situation,

at the exterior or interior of edifices. They introduced statues in characterizing the different edifices; and the employment of niches in architectural decoration very naturally followed. The proportions of their statues determined those of the niches; which were, however, subjected to the order and ornaments of the edifices in which they were employed. There can be few examples of niches cited amongst the existing remains of Greece. In their temples the statues were colossal, and placed at the extremity of the cella; being insulated, as at the temple of Jupiter Olympus, and that of Minerva, at Athens. Amongst the examples of niches presented in different edifices, there are some which are square, as at the choragic monument of Thrasyllus, and likewise at the monument of Philopapus; where there are one circular and two quadrangular niches, which are still ornamented with statues. But if we had not these references, as proofs of the employment of niches in the antique edifices, there could be nothing adduced against their extensive employment, from the number of those discovered amongst the existing remains, erected at a certain epoch, being small; as all the edifices of Greece, such as the Gymnasii, Agorai, Stadia, &c., as also all the magnificent productions belonging to private individuals, have perished. Those examples presented in the remains of the antique edifices, erected in the Roman empire in the most flourishing centuries of the art, and for the greater part by Grecian artists, will serve as proofs of the manner in which niches were employed by the ancients, of which there are two kinds. The first serve for the placing of statues; the second are destined to different uses, as the *exedræ*,

or hollow spaces of greater or less dimension, of a square or semicircular form, in walls of a considerable extent. The first are situated in temples, saloons, and basilicas, between the intercolumniations of porticoes, and in plain walls; being generally about seven feet in height, so as to contain a statue the size of life, as those at the temple of Mars the Avenger. This is the most suitable dimension, since it serves as a *scale of* comparison to judge of the exact dimensions of the edifice. Niches of this size were often employed in the interior of temples, when constructed of brick, as at the temple of the forum of Antoninus, and that of Venus, at Rome; together with a great number of other constructions of brick, where this description of niche has been adopted, both at Rome in the thermæ, and of Tivoli, in the private buildings of the villa of Adrian. Of this first kind of niche there were both round and square; when they were square in their plan, they were square also in their elevation; as likewise when they presented a semicircular plan, their elevation terminated in the same manner. Sometimes they were without ornaments, at others decorated with architraves, as at the arch of Janus: they were also employed with columns and pediments, as at the Pantheon and thermæ, and also at a temple at Nismes, generally named that of Diana. The interior of this edifice has its two sides decorated with six Corinthian columns engaged in the walls. Each intercolumniation is occupied by a niche, placed upon a stylobate, and ornamented with an architrave, formed by two pilasters that support an entablature with a pediment; presenting one of the most beautiful models of its kind with which antiquity has

furnished us. (*See* pl. 49.) At other times, when employed with columns which were situated at too great a height to admit of pedestals, the columns were placed upon consoles, as at the thermæ of Dioclesian, and at the façade of the Temple of Peace.

The second kind of niche is of large dimensions, having the pavement for its base. It is employed at the exterior of edifices, to contain groups of figures, or colossal statues; as those under the portico of the Pantheon at Rome. Others of this description, though of still greater dimensions, were sometimes placed at the extremity, in the interior of temples, for the reception of colossal figures; as at the cella of the temple of Venus at Rome; and at other times in the basilicas, to contain the seats of the tribunal, as at the misnamed Temple of Peace; which Constantine employed as a basilica; and in the basilica at Pompeii. In these last instances it is named the chalcidicum. Those presented in the saloons of the thermæ were surrounded by seats, for ease and conversation; examples of which may be found in the different thermæ, and in several saloons at the villa of Adrian, and are distinguished by the term exedræ. Lastly, niches of greater dimensions than the preceding were constructed in the walls which served as inclosures for the thermæ, answering as abutments: some were semicircular, others square in their plan; and were often employed alternately. When their dimension was very considerable, they were left open at the top, and contained many rows of seats placed above each other, serving as amphitheatres for the delivery of public discourses, or the exhibition of particular games; examples of which may be seen at the

thermæ Caracalla and Dioclesian: this kind of niche is also termed exedra. They were also employed in Greece, in the inclosures surrounding the temples, as at the temple of Jupiter Olympus, repaired by Adrian; which presents niches of this description, some of which are square and others semicircular in their plan, and are placed alternately. Their front was decorated with columns, and their summit presented a covering of wood; their dimensions not being great, and the soffit was divided into compartments, and ornamented with paintings.

The antique examples above cited furnish models of each of the different kinds of niches; and what has been said will doubtless show what character they ought to bear, according to the nature of the edifice in which they are to be employed. This character ought to be governed by the same judgment which presides in determining the form and decoration of doors and windows; not as regards utility, but as decorative objects entering into the ordonnance of the same edifice.

Of those amongst the first kind mentioned in this article, employed by the moderns, there are three classes. The first expresses strength and simplicity, the third delicacy and richness, and the second the medium: their form, in their plan and elevation, is either quadrangular or semicircular. The first is without any decoration; the second class is ornamented with an archivolt; and the third class comprehends that which is ornamented with an entablature and pediment supported by two columns.

This classification of niches is similar to that of all the other parts of architecture, expressing three dis-

tinct characters corresponding to each of the orders. Each of these niches ought to be of a proportion consistent with the ordonnance to which they relate; which is alone determined by judgment. It has in vain been attempted by many authors to determine the invariable proportion of niches, as also the other parts of architecture, without success. The general rule given for the proportion of niches is twice and a half their width in height; but the particular rule is, to divide the width of each of the three classes of niches into twelve parts, giving twenty-eight of these divisions in height to the first, thirty to the second, and thirty-one to the third. This determination of the proportions of niches, like those of the orders and the other parts of an ordonnance, are only a species of medium terms, established to serve as approximate measures to the combinations of the artist. For examples of their employment, *see* the different plates of plans, elevations, and sections, which follow.

OF CROWNING ENTABLATURES.

The expression of character, suitable to each edifice, is greatly aided by the entablature. This expression may be given in two ways; namely, by the details of the modinature, and by the choice of the ornaments. The details of the modinature are what are termed the profiles; and by the combination of these profiles, their number, greater or less projection, strength or lightness, a solemn or gay, light or strong, simple or composed character, may be produced. It

NICHE

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is from these details of the ordonnance that the connoisseur, in part, forms his judgment of the ability of the architect. No part of architecture is capable of receiving such variety in the application of ornaments. Their union with the profiles, and the due proportion of richness and repose that ought to be observed according to the nature of each edifice, is but rarely to be met with. The principal mansions of Italy are almost all crowned with sumptuous and magnificent entablatures; yet amongst this great number, two only have become classic; namely, that of Strozzi palace, at Florence, and that of Farnese palace, at Rome. (*See* pl. 39.) The entablature, pl. 38, given by Vignola, the proportion of which is the eleventh part of the whole height of the elevation, is well adapted for crowning an extensive façade. Its total, partaking of the Doric and Corinthian, is judiciously combined; and it will bear enriching or simplifying with equal propriety, according to the employment to which it may be destined. But care must be taken not to support it with columns. It is too rich for the Doric, and of too great strength for the Corinthian; and not proper for orders to which their own entablatures are alone suitable, or others which are analogous and well combined. It is not always judicious to follow step by step the compositions of authors, although they may have been adopted and acknowledged as classical. The ancients did not slavishly copy even the most esteemed examples; that which was acknowledged as beautiful and perfect, was sometimes repeated, but never in a servile manner.

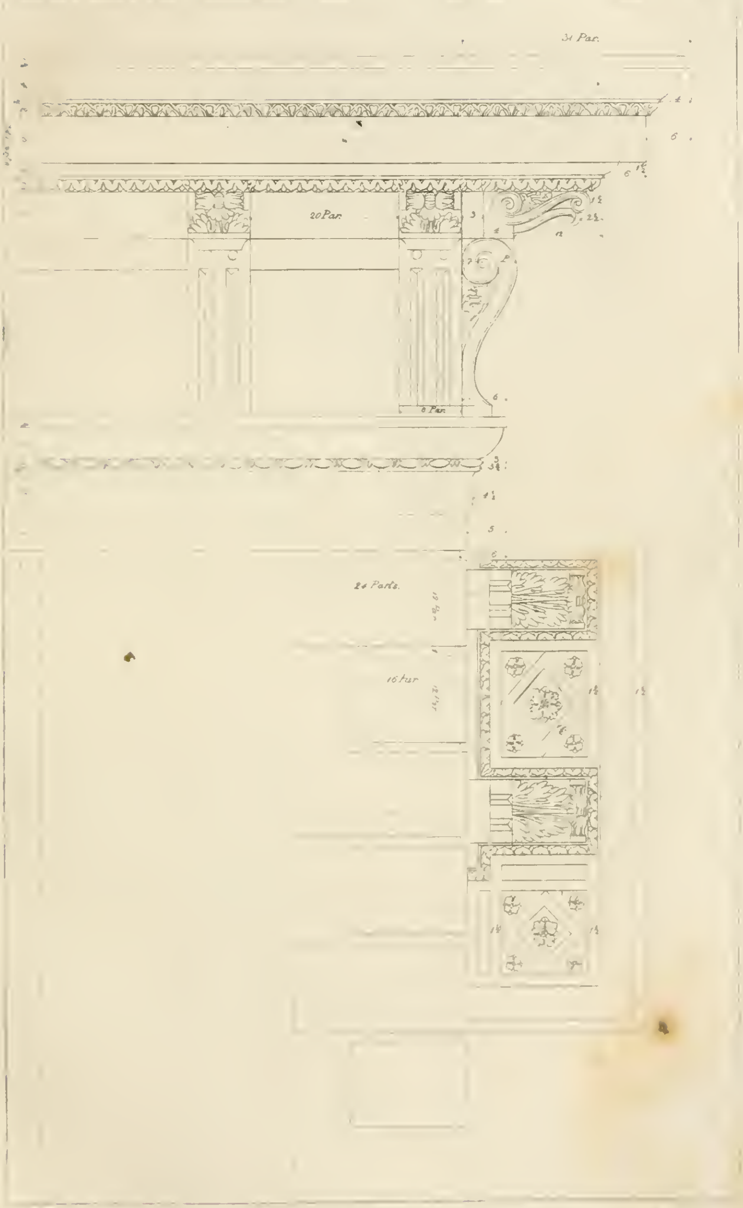
The mechanical method often adopted to determine the proportions of crowning members for ordinary

buildings, in which neither columns nor pilasters are employed, is to divide the total height from the line of base to the level of the ceiling of the uppermost story into about eight parts, giving one of these for the height of the entablature; but when it is intended to suppress the architrave, the last division is subdivided into five, two of which are given for the cornice, and the half of the remaining three for the frieze; and likewise when the cornice alone is employed, the same practice is followed in the subdivisions, two of which are given for its height.

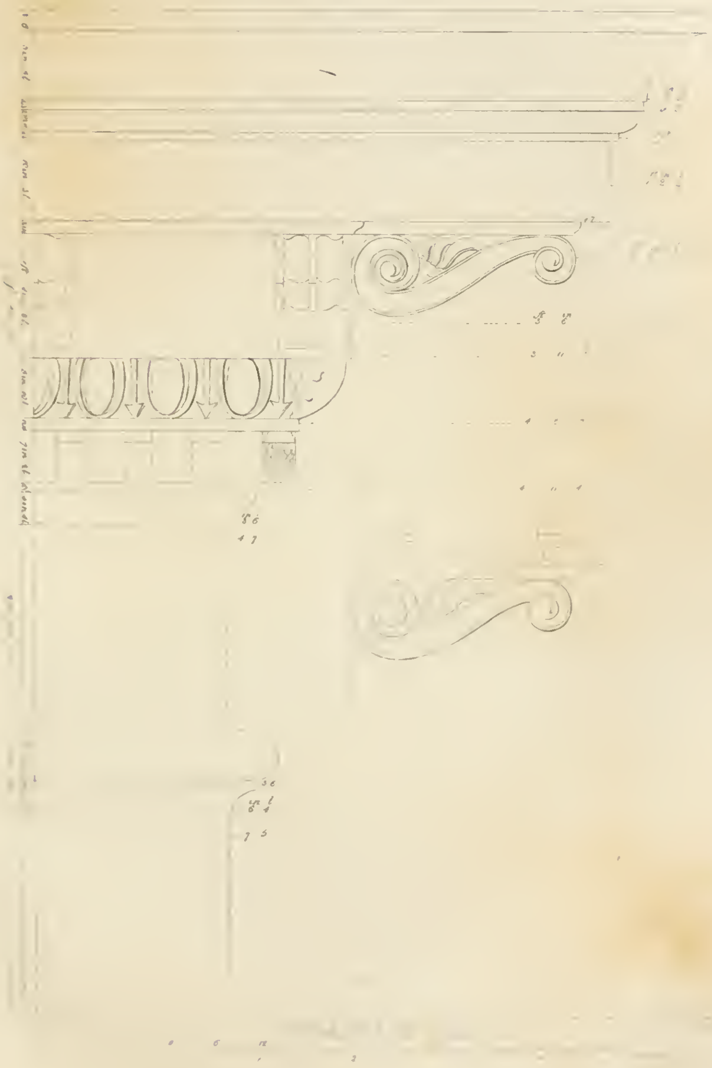
OF THE FORM AND PROPORTION OF THE INTERIORS OF BUILDINGS AND EDIFICES.

The general forms and proportions assigned by modern authors to the different apartments are, that the forms of spacious cabinets, dining, drawing, and ball-rooms, be rectangular; and that their length be equal to the diagonal of a square formed on their breadth; whilst those of saloons may be square, circular, elliptical, or octagonal. The proportions of great galleries and extensive libraries may extend from four to seven times their breadth in length. The general height of apartments is given by taking one-half of their length and breadth; for those of galleries and libraries of considerable length, once and a half their breadth. The proportions of staircases and passages or corridors (the breadth of the latter may be from one-third to one-fourth of that of the principal rooms) are determined by the extent

CROWNING ENTABLATURE.



CROWNING ENTABLATURE,

Pl. 39.

of the buildings and apartments; it being essential in architecture, always to observe a strict relation between the parts and the total.

The height of the chambers on the second story are, according to the common methods, made about one-twelfth part less than that of the rooms below; and the height of a third story three-fourths of that of the second. As all the rooms of the same story are commonly of an equal height, while convenience requires them to be of different lengths and breadths; the proper relation between their height and the other dimensions cannot always be preserved without additional expense. Where this is not an obstacle, the height of the story may be governed by that of the principal rooms; while the proportions of the lesser rooms may be regulated, and their appearance improved, by means of coved and flat, groined, arched, or vaulted ceilings.

Vitruvius gives three different rules for the proportion of vestibules. The first consists in dividing the length of the vestibule into five parts, three of which are given for the breadth; the second into three parts, giving two for the breadth; and the third in taking the diagonal of a square for its length, whose side is equal to the breadth of the vestibule. Their height is less by a fourth part than their length.

The pteromata (a range of columns at each side of the vestibule, leaving a passage between them and the wall,) situated on the right and left, should have in breadth, if the length of the vestibule be from thirty to forty feet, each a sixth part of its length; if it be from forty to fifty feet, a seventh part; if from fifty to sixty feet, an eighth part; if from sixty to

eighty, a ninth part; and lastly, if from eighty to one hundred feet, each one-tenth part of its length for their breadth. The architrave placed upon the columns forming these passages should be of such an elevation as to make the height equal to the breadth. The intercolumniations should not be less than three diameters, nor more than four. If the Doric order be employed, they are governed by triglyphs.

The tablinum, or cabinet, should be, if the width of the vestibule be twenty feet, of two-thirds of that dimension; if it be from thirty to forty, one-half; and if from forty to fifty feet, the proportion of the cabinet should be two-fifths of the width of the vestibule. The height of the cabinet should be an eighth part more than its width. The principal entrance of the least vestibules, should be two-thirds of the width of the cabinet, and that of the large vestibules one-half of the same width.

The triclinia, or dining-rooms, the œci, or banqueting-rooms, and the exedræ, or drawing-rooms, should have double their breadth in length, and their height should be equal to half of their length and breadth taken together. The pinacotheca, or picture-gallery, like the drawing-room, should be spacious,. The œci, or Corinthian, and the tetrastyle, or Egyptian apartments, though of similar proportions to those prescribed for dining rooms, should be of great dimensions, on account of the columns employed.

The Corinthian and Egyptian apartments differ from each other, by the Corinthian having but one order of columns placed upon a pedestal, or otherwise upon the pavement, and supporting their architrave and cornice of wood, or coated with stucco; above which is an

arched ceiling. But the Egyptian apartments have an architrave upon their columns, and above the architrave is a floor, which extends from the columns to the wall.

This floor is constructed in such a manner as to form an open terrace around the whole. Above the architrave, and perpendicularly over these columns, others are placed, whose height is less by a fourth part than those beneath them. There is an architrave, with other ornaments, upon the upper range of columns; and the roof has a straight ceiling. Between the upper range of columns are windows, which give to it the appearance of a basilica, and this constitutes the difference between the Egyptian and the Corinthian apartments.

The Greeks, adds Vitruvius, have a room which they name Cyzicene. It has a northern aspect, with a door in the centre, and is surrounded by gardens. Its length and breadth should be sufficient for the convenience of placing two tables in opposite but similar situations to each other. On the right and left are windows in form of doors, for the accommodation of enjoying the exterior aspect. Its height is once and a half its breadth. Thus the cyzicene of the Greeks answered the same purposes as the triclinium of the Romans.

It would be difficult to assign, even to the most extensive and remarkable rooms in modern architecture, either particular forms or a general character, which would furnish the basis for a theory of a detailed description.

Palladio states, that the most elegant forms for apartments and rooms are seven in number; namely,

the round, which are the most rare; the square; those whose length is equal to the diagonal of the square formed upon their breadth; those of a square and a third; a square and a half; a square and two-thirds; and lastly, of two squares; and that the best proportion for the height of these different apartments, when they have flat ceilings, is in giving their breadth for their height. But if those which are square in their plan be terminated by semicircular or vaulted ceilings, they should have one-third more than their breadth to the key of the arch; and the height of those whose length is greater than their breadth is given by adding the length to the breadth, and taking the half.

Scamozzi observes, that the ancients made their apartments square, or otherwise twice their breadth in length, and that their general heighth at the least was their breadth; or, at the most, the half of the length and breadth together. The following are the five different proportions which he proposes for apartments. The first, says he, are square; the second have once and a quarter their breadth in length; the third, once and a half; the fourth, once and three-quarters; and the fifth, twice their breadth in length. For the height of the first, he prescribes their breadth; to the second, an eighth more than their breadth; to the third, a fourth; to the fourth, three-eighths more than their breadth; and to the fifth, once and a half their breadth; and he further adds, that the first, or ground-story, ought to have the greatest elevation, which agrees with the opinion of Palladio, who says, that each story ought to have a sixth less in height than that immediately below it.

OF DISTRIBUTION.

One of the most important parts of architecture, the aim of which is to render its various productions healthful, convenient, and agreeable, consists in judicious distribution. This branch of the art, as practised by the ancients, is that of all others, of which we have the least knowledge. Private habitations are not constructions of a nature capable of surviving the overthrow and revolutions which destroy cities. Was it not for the discoveries made of the cities buried by the eruptions of Vesuvius, our knowledge would be confined to the obscure and problematic descriptions given by a few writers of antiquity. The small number, and the state of preservation of those houses which have been discovered, have, however, tended to throw but little light on the distribution of interiors. Nothing is more subordinate to domestic customs and habits than this part of architecture. What is remarked in the plans of these houses is, a very simple and almost uniform distribution. At the villa of Pompeii, however, the studied and skilful application of ornaments, and the judicious distribution of offices and interior conveniences, make it presumable that this part of comfort and pleasure must have been carried to a great extent, both in town and country houses belonging to wealthy individuals.

Modern artists concur in the probability of this conjecture, from an examination made of the plans of the villa of Adrian, at Tivoli. The apartments are distributed with the greatest art; the baths, and all the other conveniences, are arranged in the most

diligent and able manner; those rooms which were of a large dimension were lighted in a manner very appropriate to the climate; and with great art accommodated to the different hours of the day during which they were employed. These shapeless ruins prove to us, that the art of distribution, and the luxury of conveniences, were carried to the greatest extent in the Roman empire.

Vitruvius, treating on this subject, c. 7, b. 6, makes the following observations. The winter triclinium, or dining-room, and the bath, should be situated opposite to the winter's declining sun, because its light is there useful; besides, the western sun shining thereon, produces heat, and makes the aspect warm and pleasant in the evening. Bed-chambers and libraries should face the east, for in these the morning light is required; it is also necessary in order that the books in libraries may not decay, for in those that are situated to the south and west they will be damaged by the damp and by the worms which the humid winds generate and nourish. The rooms destined to be employed during spring and autumn, should face the east; for the windows being then turned from the sun, proceeding westward, render those apartments temperate at the time they are generally employed. The summer dining-room should be situated towards the north, because this aspect is not, like the others, rendered hot at the summer solstice; for being turned from the course of the sun, it remains always cool, and when used, is salubrious and pleasant. The same aspect is also the most proper for the pinacotheca, or picture-rooms or galleries, on account of the equality of light.

The most general observations, as regards aspects in our own country, are, that the south-east is the most esteemed; and that the south and due east rank next. Again, the south-west is regarded as the most objectionable, because the rains proceed more from that point than from any other. An aspect due north or west, has equally a disadvantage; the former from being deprived of the sun, and the latter by being incommoded with it, during a considerable portion of the day.

Distribution is intimately connected with the climate, customs, social habits, and the precedents of ostentation and vanity; and if these differ in each age and nation, it is difficult to conceive how this part of architecture can be submitted to rule, or any positive examples be proposed. One point only can be agreed upon, which is conveniency; as this doubtless constitutes the base of distribution. Nevertheless, even conveniency is local and dependent on habit; which differing every where, must necessarily produce different results.

A summary of the different opinions of those who have treated on this subject, more particularly as regards residences, is contained in the following general remarks.

A building ought to present itself in an advantageous manner, and have a good entrance.

The best situation for the body of the house, is between (if it is intended that there should be each of these) the court and garden.

The offices and stables should be placed in such a manner that the apartments may not be incommoded; which may be avoided by placing them so as to range

with each side of the court. One of these sides, that on which the offices are placed, should be connected by a passage or vestibule that leads to the dining-room; in order that the service of the table may be conveniently attended to.

Irregularity in the forms of the different rooms or apartments should be avoided: it ought only to be permitted when its application to some detailed part may procure a greater space or more desirable situation to any of the principal apartments.

When, in a spacious mansion, it is intended to form an extensive range of apartments, it is necessary to avoid placing any rooms destined for the use of servants in the same range.

In interior as in exterior distribution, symmetry ought generally to be observed, except in some cases of interior distribution; on which occasions the necessary relation of the opposite sides should be judiciously arranged.

It is an indispensable rule, that the interior distribution accord with the exterior decoration.

In concluding this subject, which, as before remarked, forms one of the most important parts of architecture, it may not be superfluous to offer some further observations. If a vestibule, gallery, or any other part, present itself at the entrance of a house or edifice of more than one story, the staircase ought to be conspicuously situated, and the distribution of each story should be so judiciously conceived and arranged, that the landing may afford the greatest facility to each principal or private room or apartment. But as this subject will not admit of a detailed indication, it is necessary, before forming plans of the distribution

of either public or private edifices or buildings, to ascertain the particulars of all that is required, the general and detailed relations of locality; and of the situation, which is no less essential, so as to profit by the different prospects that may present themselves from the interior, as also for the aspect of the exterior. For a judicious composition of a plan cannot be expected to result from an inaccurate knowledge of the desired conveniences, or an inadequate study of the advantages or disadvantages of the site. To effect this desirable end, no design should be attempted without previously forming a correct and detailed memorandum of all the exigencies.

OF DOMES.

Before proceeding to pass any observations on the nature and employment of the dome, it will, perhaps, be necessary to give a history of the form and application to which the arch was subjected amongst the ancients, and afterwards that which it presents in the middle ages; and lastly, the differences it underwent, in its form and application, on its introduction into modern architecture.

The generality of writers who have visited Egypt, agree as to there being no indication of a real arch amongst the constructions of that country. There are, however, many examples that present a kind of essay or rude attempt at this method of construction. In the pyramids are found a species of raised ceilings, which terminate in a point by means of stones, which

are laid flat, and project the one over the other. The uppermost, or centre stone, instead of forming a key, that is to say, being dressed conically, is laid flat upon the others, without forming any stay whatever to the superior part of the masonry. All the different erections of the same period, which present this form in their construction, offer the same arrangements. Pliny, in speaking of the repairs which the subterrains of the labyrinth had undergone, employs the word fornex, which is applicable to straight ceilings. The remains of a bridge over a canal leading to Coptos, exhibits flat stones of considerable length, extended from one pier to the other. Those discovered by Pocock, are of a date posterior to the arrival of the Greeks in that country; and the arch spoken of by Lucus, was erected at the decline of the Roman empire.

As the climate of Egypt accorded well with the early custom of forming excavations, and subterraneous constructions, so likewise it was very favourable to those which were afterwards erected in imitation of the same type and style. The employment of flat coverings is also justified by the absence of rain, which is substituted by the periodical overflow of the Nile. In constructing the coverings of galleries, slabs of stone were used; extending in one piece from the columns to the wall. The temples do not appear to have been composed of interiors requiring immense coverings; and, indeed, independent of the practices which were already established, the scarcity of wood in this country must have prevented its extensive employment in their edifices.

The inclined carpentry, on the contrary, with which

the constructions of Greece were surmounted, gave rise to the pediment; and in like manner the arched covering was suggested by the roof. Hence we may account for their absence in Egypt. In the last-mentioned country, the soffits of the ceilings present only a smooth surface, without indication, as in Greece, of the framing of the carpentry producing compartments. This indication of the employment of wood particularly characterizes this part of the Grecian architecture. Its absence sufficiently proves that of the material in the model of the Egyptian architecture.

Carpentry affords simple and economical means of uniting under one covering the most extensive interiors; and this being once established by necessity, the natural progress of ideas must have endeavoured to replace it, by constructions more solid and durable.

That the Greeks have constructed what we designate rotundas is beyond a doubt, as also that they have employed carpentry to cover similar interiors. The Odeon furnishes us with an example. Pausanias describes a circular edifice named Philippeum, erected in honour of Philip, king of Macedonia, the covering of which was likewise of wood; having at its summit a species of ornament of bronze, to which the ends of the rafters were secured. The same writer makes mention of a circular structure at Epidaurus, the whole of which was constructed of white marble. Also of another of the same form and materials, but of a more ancient date, at Orchomenos; covered with an hemispherical arch, or what is termed a cupola of stone; having its key of the same material. Thus hemispherical arches were constructed in Greece, not only of wood, but of stone.

This manner of construction was afterwards adopted at Rome, and, as forming a part in the thermæ, palaces, &c. received new modifications, which gave rise to arches presenting other forms than those which had hitherto been employed. Such were the surbased arch (testudo), the hemispherical arch, applied to elliptical and octagonal plans with pendentives (hemisphærium), and the arch with lunettes, or groins (camera lunelata). The employment of this last species became indispensable in the construction of immense interiors requiring large openings for the admission of light; the windows naturally being inscribed within the space formed by the intersecting arches. . There is no example of this description of arch on an extensive scale, anterior to the construction of what is commonly, though doubtfully, named the Temple of Peace. The same species was likewise employed in the thermæ. Those bearing the name of Dioclesian are the best preserved. The great saloon in the centre of this thermæ exists in its entire state, and is used at the present time as a church. If this construction be minutely examined, the germ and principle of the pointed, or what is more generally termed the Gothic arch, to which such trivial and improbable origins have been assigned, may be discovered. This saloon is covered by a groined arch or vault; the springing points of which are supported by eight granite columns, which decorate it sides. The whole of this vaulted covering is composed of three large compartments, formed by a longitudinal and transversal, or by intersecting arches.

This example, which has been selected in preference to any other, on account of its being more

generally known, may serve to show, that necessity alone, which requires that extensive interiors be constructed after this solid manner, suggested long before the time of the Gothic, the system of intersecting arches. By comparing the naves of Gothic churches with the above-mentioned example, no other difference will be found than what results from the nature and employment of the materials. The springing points of the arches of the thermæ rise from columns, in the same manner that Gothic arches rest upon pillars.

We shall now resume our researches into the alterations that the forms and employment of the hemispherical arch of the ancients underwent, in its application in modern architecture, from the restoration of the arts to the present time.

The general form of the antique temples, says M. Quatremere, is that of a parallelogram. But a considerable number were erected that were circular in their plan. This last-mentioned form appears more particularly to have been observed in temples dedicated to certain divinities, such as Vesta, Sybilla, Bacchus, &c. The most celebrated, and also the best preserved, of the antique rotundas, is that at Rome, which bears the name of the Pantheon, supposed to have been dedicated to all the deities. The ancients executed no edifices, either of a curvilineal, or any other form, presenting the particular character which distinguishes the modern cupolas or domes from the antique rotundas. The worship of the ancients consisted of sacrifices, followed by torrefactions, libations, and many other customs, which from the smoke, odour, and cleansings, that attended them, would have been

insupportable in the interior of a confined edifice, and which alone could be practised in the open air. Thus a temple amongst the ancients was in reality but a species of sanctuary, generally of a limited extent, and in some cases without covering. The sacrifices were made at the front of the temple, in an inclosure which was often of great extent, and by which it was surrounded. It is even doubtful whether the rotundas, or other edifices of this kind, have been temples. The Pantheon is suspected, and not without great probability, as having formed part of the thermæ of Agrippa. It is the only one of the saloons that has escaped destruction, amongst all those whose remains are approximately situated, and the great total of whose plan is known to the generality of artists.

The difference of the mode of worship introduced by the Christian religion, required interiors of a sufficient extent to contain the number of those who attended the ceremonies; and as instruction formed a principal portion of that worship, it became necessary that the limits of their extent should be such as to admit of the minister being heard by all the individuals present. Amongst all the ancient edifices, none presented a form so well adapted for that which was required as the basilica, whose spacious interiors were proportionate to the nature of the ceremonies. The disposition of their plans being in the form of the letter T was alone sufficient, independently of their analogy with the sign of Christianity, to cause the form of a cross to be adopted in the plans of the first churches afterwards erected.

The desire which they manifested to retrace in this form the sign which was the principal object of their

veneration, caused them to depart from time to time, from the simplicity of the basilica, by the addition of a transversal nave crossing the principal nave at right angles. This point of the intersection of the two naves, presenting itself from all parts of the edifice, necessarily formed one of its most prominent features. And if the custom of placing the principal altar in this situation was for a time undetermined, it was because time had sanctioned its anterior disposition in the semicircular recess at the extremity of the edifice; whence the construction of a plan thus disposed, naturally conduced to the decoration of this part in a particular manner, and which could not fail to foster and give rise to the idea of erecting domes or cupolas.

The first cupola with pendentives, after the antique constructions, was that of St. Sophia, at Constantinople, which exhibits the progression observed in productions of this kind. It cannot be positively asserted that this dome is situated precisely in the centre of a cross, as the four branches have not the extent which it has since been customary to give to naves; in other respects the exterior form of this edifice is square, except that one of the parts is prolonged more than the others, and terminated by a hemicycle, wherein the altar was placed. The first employment of pendentives, as forming a portion of the base of a cupola, is not of modern invention; the antique presents us with an example in a saloon of the thermæ Caracalla, the plan of which forms an octagon having eight pendentives, constituting a part of the base of the hemispherical arch with which it was covered.

The church of St. Mark, at Venice, which is supposed by some to have been formed from that of St.

Sophia, at Constantinople, expresses in its plan the form of a cross still more distinctly. In reality there is but little similarity between the flat curved cupola of St. Sophia, and the five domes which rise in so singular a manner above the church of Venice. The plan of St. Sophia is of a form resembling those of the square saloons of the antique thermæ; having a portion of its sides decorated with a range of columns, and at each extremity there is a large semicircular niche. The pendentives, which form the circular base of the dome, spring from internal angles. Those of St. Mark are in projection, the principal nave being intersected by a transversal one at right angles. Lastly, the greatest similarity which exists between these two edifices, consists in the style of their architecture, and certain parts of their decoration. The cupolas of these two churches, even those of St. Mark's, notwithstanding their elevated curve, present nothing resembling modern domes; namely, the elevation of a cupola upon a circular basement, forming a tower interiorly and exteriorly.

Passing over the numerous Gothic attempts, such as those at the cathedral of Milan, formed of ogives, the situation of which is announced at the exterior, by a species of decoration rising above the edifice, the cathedral of Pisa presents the first example. If Buschetto acquired any degree of fame in the erection of this cathedral, it was not on account of its cupola, which forms so puerile and uninteresting an accessary of an edifice, that in other respects presents so important a feature in the history of architecture, but by the disposition and extent of its naves.

Brunelischi, who raised the cupola of St. Maria del

Fiore, at Florence, was the first that presented the idea of double cupolas, as also their elevated curvature; which has generally been imitated in those since erected.

The church of the Augustines, situated at Navonna Place, at Rome, is supposed by some writers to be the earliest example of a dome placed upon a cylindrical body or tower, supported by pendentives, which sprung from between the four arches that united the principal and transverse naves; yet Constantinople and Venice presented, a long time previous to the erection of the edifice in question, cupolas upon pendentives; and at Pisa and Florence we see examples of those raised upon a circular basement or tower. The dome of the church of the Augustines, above alluded to, has existed but two hundred and eighty years.

The designs of Bramante, for the erection of St. Peter's, at Rome, were more pure and correct than those of Michel Angelo. The unity that exists between the actual dome and the other parts of the church is much admired; but a more perfect accord would have existed under more simple forms from the designs of Bramante. Being less burthened with details, and more correct in its forms and decorations, though of less dimensions, its proportions would have been greater; and being less ornamented, it would have been richer. Bramante intended to have imitated, in the naves of his church, the Temple of Peace: and the designs which he composed bear testimony to this. The divisions which the total presents are great and simple; no useless projection, or complicated lines; but great and even masses, plainly ornamented, and crowned with an entablature destined to receive the

spring of the arches. In the plan, details, and also the general form of his cupola, he appears to have borne in mind that of the Pantheon. The simplicity of the immense naves which were to have formed its basement, would have served to increase its intended richness. Bramante so well knew the effect that would result from this opposition, that he sought the same arrangement of contrast at each of the three extremities of the naves, where the colonnades that he adopted would have given great relief and harmony to this vast total, such as it is impossible to obtain by the employment of massives. It is, doubtless, questioned by some, whether Bramante did not sacrifice, in many respects as regards solidity, the possibility of the execution of his plan, to its elegance and regularity; as we learn that, after his death, Peruzzi, Sangallo, and Raphaello, were employed to devise the most proper means to be adopted, so as to render the supports of this great edifice of a sufficient consistence in proportion to the masses which they had to sustain. The foundations laid by Bramante were badly and too precipitately executed; and Michel Angelo, who was afterwards the architect of this edifice, hastened to repair this fault, by strengthening those that were commenced, and devising the necessary means of securing the solidity of those connected with his own designs. He changed the form of the plan of Bramante from a Latin to that of a Greek cross, profiting from Brunelischi, by the idea of a double cupola; to which he proportioned the pillars and pendentives, securing such advantages in each part as the solidity of the construction of the whole required, and also making them subservient to the purposes of decoration.

Michel Angelo, more fortunate than Bramante, had successors who adhered to his designs. Vignola and Giacomo della Porta were compelled to follow them with exactness, except in giving a slight increase of elevation to the exterior curvature of the cupola. This production, so astonishing, from the immensity of its dimensions, and the great exertions that its construction required, is in its form and proportion, interiorly and exteriorly, the most perfect example of its kind that modern architecture presents; notwithstanding the puerile and unmeaning, although colossal façade, which serves it as a base.

Italy soon witnessed the employment of cupolas in almost all the edifices destined for religious purposes, each presenting similar designs to that of the great model at St. Peter's, with the exception, however, of some degree of variety in their construction or decoration, which in the present instance does not merit an enumeration. This taste for cupolas also spread itself through the rest of Europe. England and France, almost at the same period, entered into competition to rival the fame of modern Rome, in the construction of similar edifices. Sir Christopher Wren erected St. Paul's, whilst Jules-Hardouin Mansard raised that of the Invalides; the first resting its claim on its extent and judicious construction, and the second on the magnificence of its decoration. The most striking particularities in the construction of these two cupolas are, that Sir Christopher Wren was the first who formed apertures in the massive pillars of the dome, to serve as a free passage to the side aisles, and Mansard was the first to produce that effect which arises from the judicious introduction of light, in the dis-

position of the double arches, or calottes, of the cupola which he erected. The latest production of any importance of this kind, which will probably be the last, is St. Genevieve's church, at Paris. This example offers no remarkable differences in its conception from those already enumerated, except that its total, including the three calottes of its cupola, is constructed of stone; which will obtain for it a distinguished rank in the history of similar structures. The opinion that this example will probably be the last of its kind is founded on the following reasoning. To judge of the invention and employment of modern cupolas or domes from the prodigious expense which they incur, from the exertions that their construction requires, and the emulation that has induced the different nations of Europe to dispute the point of daringness, elevation, and magnificence, in productions of this species; or from the sentiments of admiration and the keenness of the different critiques that this subject has in turn called forth, would lead us to believe that their composition constitutes the great principle of the power of architecture, and that this discovery was wanting to complete the fame of the ancients. And again, that such a cupola as might present the various beauties contained in the finest works of this description, would form the point of supreme knowledge and of beauty in the art. Other critiques on this ambitious mode of construction, by developing all the vices which it has introduced into modern architecture, would induce us to infer, that this pretended achievement has rather wasted the resources of the art than increased its dominion. In reality, say they, what has architecture profited by this introduction of forms, masses, and

constructions, whose union is unnecessary, and immensely expensive? Did not the ancients construct vast interiors, as the naves of the basilicas; the proportions of which, both as regards their elevation and extent, were prodigious? Did they not construct rotundas of a superior dimension to those of the moderns? What then has this conjunction of the basilicas with rotundas produced? Nothing, except churches of a more imperfect design, and rotundas less solid. And further, what signifies this imposition of one edifice upon another? And what object is gained by this circular edifice being placed upon one that is square?

These objections, say the opposite party, are only specious. If the ancients have not united these two descriptions of buildings, which they separately employed in the formation of their edifices, it was because the uses to which their temples were employed, rendered it impossible to draw thence the idea of such a union. As regards this species of superfetation, which is considered as a pleonasm of intention, why not make the same objections to the repetition of stories, or any part which crowns another? When the disposition of two naves which traverse each other appear to require decoration, so as to conceal their intersection; when the possibility presents itself of deriving, by means of this disposition, a mass of imposing and magic light, and also of presenting an opportunity for the employment of a composition offering the grandest effects that architecture has ever produced; when the sight, which rests with pleasure upon pyramidal forms, and the imagination, which no less delights in all that bears the character of great-

ness and boldness of enterprise, seem to require something to surmount the summit of our sacred edifices, whose aerial elevations may ascend towards the Divinity to whom they are dedicated. What mean then these timid and confined ideas? Is it not allowable to elevate above any part which will serve as a base all that it is capable of supporting? and except the limits of possibility, is it not imagination that ought to determine the bounds which the artist should observe, rather than judgment deduced from the principles of the art?

All these considerations have doubtless their value, particularly with those who appreciate architecture according to their caprice rather than from practical judgment; and who seek greatness in excess of dimension, in preference to justness of proportion. To gain, however, a just knowledge of the causes that propagated the employment of cupolas, it may be observed, that they rest on two precedents.

The first of these precedents may be traced to the taste transmitted by the Gothic mode of construction, in the employment of the antique architecture, at its revival by the moderns. When the secret of true sublimity and beauty was lost to the arts, and artists were ignorant of the means whereby real greatness is produced, they employed their imaginations to effect such designs as appeared marvellous and gigantic. They believed, that on increasing the decoration, or multiplying the ornaments, applied to any object, depended its degree of beauty; and that to exceed in greatness, it was necessary to exceed in height. It was at this period that the façades, towers, roofs, and belfries of churches, disputed with each other the

merit of elevation; their reputation being established according to their height. So that when the taste created by the purity of the antique began to manifest itself, and to redeem the then existing architecture from all these prejudices, which are in opposition to the judgment of an enlightened mind, the only one which it was found impossible to overcome was this prodigious height of construction, employed in the erection of churches. If an edifice had been raised at this period, possessing in its architecture all possible merit, it would, from the power of habit, have been regarded as the timid production of a degenerated style of the art, if its extent did not equal that of the Gothic naves. Hence it became necessary to continue to erect these prodigies of elevation, in order to insure the public opinion in their favour. When the orders of architecture are employed, it is necessary to adhere to the respective proportions which they prescribe; but if these are not considered to present sufficient solidity as points of supports to arches of an extended diameter, arcades with columns offer themselves, affording at the same time a regularity of decoration, together with that solidity which is requisite for supporting, even at the highest degree of elevation, the most extensive constructions. They also present the means of surpassing in height, greatness, and solidity, the Gothic style; without the aid of that multiplicity of buttresses that prop its elevations.

It was from being habituated to behold the appendages, spires, towers, points, pinnacles, &c., elevated in the air, so as to present themselves at a distance, that the idea of domes was suggested, to replace these objects, by presenting the same advantages:

and it was adopted with emulation by all those cities, the inhabitants of which were desirous of establishing the reputation of their churches.

The second precedent that gave rise to the employment of domes was, the form that was given to churches. The use that the early Christians made of the basilicas, for the public celebration of the mysteries of their religion, might have in some degree concurred to give those which were afterwards erected the form of a cross; but it appears certain, that at this period they studied to represent as often, and in as many situations and forms as possible, the sign expressive of their newly-established religion; and that, whether it was due to chance in the commencement, or to invention afterwards, the form of a cross became the characteristic of the plans of the churches of Christianity. It was doubtless the idea of uniting the principal and transverse naves at a common point by an imposing decoration, that gave rise to this employment of cupolas; which produce many reflections in an enlightened judgment, that the repeated application of these objects cannot fail to call forth. Was it, however, really deserving of so much trouble and expense, to avoid, in the interior dispositions of churches, the defect occasioned by the point of intersection of the naves, to conceal which the cupola is said to have been employed? Would it not have been more effectual to have avoided this defect, by adopting a more simple form of plan? Was this form of a cross prescribed in such a manner that it could not be renounced? Do not a multitude of examples prove the choice of the forms most suitable for Christian churches to be perfectly free? What a

sacrifice of expense this disposition of the form of a cross incurred, whilst, at the same time, it produces less effect than might otherwise have been obtained; for if the expense occasioned by the transverse nave, which presents an insignificant addition, had been employed in enlarging or embellishing the principal nave, how many advantages would have been gained, both as regards unity, and all the other qualities which serve to perfect the art!

Since the time that these prejudices lost a portion of their influence, true greatness has been acknowledged to exist in proportions, and not in dimensions; and the pure and rich style of the antique ordonnances have replaced the massive piers of the moderns, which are of considerable dimensions, and present few openings. Thus it was discovered that the construction of cupolas must necessarily be renounced; and the more the antique style was introduced in the composition of churches, the more this unnecessary combination (that incurs an expense equal to ten churches constructed according to the laws of correct taste, and offering in their place but one, and that imperfect,) has fallen into disrepute. The most striking proofs of the want of solidity in certain cupolas has, perhaps, further contributed to suppress their employment. The most noted of all, that of St. Peter's, has occupied, during half a century, the continued care and inspection of several architects, by exhibiting in its construction many very considerable rents. Bortari, more than any other, applied himself to discover the means by which the security of this edifice might be insured, and declared the generality of similar constructions to be liable to the same disad-

vantages. If time and experience prove, independent of any opinion on this subject, that this description of constructions is subject to an incurable evil, can any reasonable mind confide the fame of a nation on a species of construction which, although it incurs the most enormous expense, contains in its very nature the germ of destruction? The greatest advantage of architecture is in the property it possesses of immortalizing the genius of the nation that has employed it. It is surely necessary, therefore, in important national edifices, to be assured of their duration. Indeed, the pleasure derived from the appearance of edifices is more dependent than is generally imagined on the idea which is formed of their solidity. Numerous other observations might be made on the nature of these constructions, as regards the want of unity they occasion in the interior of churches, in the form of a Latin cross; and also the dissonance and want of harmony of their exterior, which presents a circular edifice, elevated, or apparently situated, upon the roof, or above the pediment of the peristyle of a quadrangular edifice, which serves it as a basement. It is reserved for the judgment of others to determine how far these considerations may be applied to the employment of cupolas. And without attempting to prescribe to what extent, as regards an exact imitation, the form and disposition of the ancient basilicas may with propriety be followed in the composition of our churches, it is, however, manifest that they ought not to be lost sight of. If designed after this manner, they would present a regularity in their plan, joined to a nobleness in their elevation; and the talented artist would find himself enabled, by following this

A COMPARATIVE TABLE OF THE PROPORTIONS OF THE MOST CONSIDERABLE CUPOLAS,

CONSTRUCTED IN VARIOUS COUNTRIES, AND AT DIFFERENT EPOCHS, FROM THE EARLIEST TO THE PRESENT TIME.

FIRST EPOCH.

Antique Cupolas, constructed previous to the reign of Constantine.

NAMES OF THE CUPOLAS, *And of the Cities in which they are situated.*	Interior diameter, taken at the spring of the cupola		Height of the interior, taken from the pavement of the edifice to the summit or border of the aperture of the cupola.		Period at which their construction was completed.
	Feet.	Inches	Feet.	Inches	Before Christ.
ROME.					
Cupola of the Pantheon	143	7	141	1	18
Cupola of the Temple of Minerva-Medica, whose plan presents a regular polygon of ten sides	77	6	97	1	0
PUZZUOLI.					
Cupola of a Temple of Diana	97	9	77	10	....
Cupola of a Temple of Venus	87	1	76	9	....
ROME.					
Cupola of an Antique Temple, at the present time forming a part of the Church of SS. Cosma, e Damiano	42		40	6	....
Cupola of a Temple of Bacchus, now the Church of S. Constanza	37	10	65	1	....
Cupola of the Circular Saloon belonging to the Thermæ of Caracalla, taken from the existing ruins, and the restorations of Palladio	112	4	116	3	Anno Domini. 217
Cupola. Circular with pendentives, in an octagon saloon of the last-mentioned Thermæ	62	9	68	3	217
Cupola of a round Saloon of the Thermæ of Dioclesian, now the Church of S. Benardo	74	0	83	0	302
Cupola of another of the same Thermæ, at present serving as Vestibule to the Church	63	2	74	8	302

SECOND EPOCH.

Cupolas constructed from the reign of Constantine to the time of Bramante.

NAMES OF THE CUPOLAS, *And of the Cities in which they are situated*	Interior diameter, taken at the spring of the cupola.		Height of the interior, taken from the pavement of the edifice to the summit or border of the aperture of the cupola.		Period at which their construction was completed.
	Feet.	Inches	Feet	Inches	Anno Domini.
RAVENNA.					
Cupola of S. Maria della Rotonda, at the environs of Ravenna, formed of an excavation made in one solid block of Istria stone	36	3	60	10	530
Cupola of S. Vitale	54	11	91	2	547
CONSTANTINOPLE.					
Cupola of S. Sofia	112	0	201	8	537
VENICE.					
Cupola of S. Marco; that in the centre	44	3	} ..	....	984
The four others of the same church	34	10			
SIENNA.					
Cupola of Il Duomo	57	3	147	11	1250
FLORENCE.					
Cupola of S. Maria del Fiore	138	8	310	4	1436
Cupola of the Chapel di Medicis	91	9	199	6	1636
Cupola of the Baptistery of Florence	85	8	110	....	....
MILAN.					
Cupola of Il Duomo	57	5	253	1	1426

THIRD EPOCH.

Modern Cupolas, constructed from the time of Bramante to the present day.

NAMES OF THE CUPOLAS, *And of the Cities in which they are situated.*	Interior diameter, taken at the spring of the cupola.		Height of the interior, taken from the pavement of the edifice to the summit or border of the aperture of the interior cupola.		Period at which their construction was completed.
	Feet	Inches	Feet.	Inches	Anno Domini.
ROME.					
Cupola projected by Bramante for St. Peter's	142	3	301	3	....
Cupola of the Tempietto di Bramante	14	8	34	5	1502
Cupola of Madonna di Loretto	48	6	92	5	1507
Cupola of St Peter's, as executed by Michel Angelo	138	8	330	9	1580
Cupola of S. Agnese, in Piazza Navona	56	5	158	5	1660
Cupola of the Church del Gesu	53	3	151	6	1578
Cupole of S. Maria, in Vellicella	44	10	118	10	1599
Cupola of S. Luca, e S. Martina	38	6	107	2	1668
Cupola of S. Andrea della Valle	54	11	192	4	1607
Cupola of S. Carlo al Cerso	49	10	186	7	1664
Cupola of S. Maria in Portico	56	6	124	8	1665
PLASENCIA.					
Cupola of S. Agostino	30	11	114	10	1564
VENICE.					
Cupola of a Church at Trevigieno, by Palladio	40	9	51	6	1560
Cupola of S. Giorgio Maggiore	41	....	117	....	1566
Cupola delle Zitelle	45	7	87	9	1570
Cupola of Il Redentore	46	9	119	6	1580
Cupola della Medonne della Salute	69	10	133	6	1640
NAPLES.					
Cupola of S Filippo	38	5	112	7	159
TURIN					
Cupola of S. Lorenzo	47	5	108	10	1664
Cupola della Superga	64	....	128	....	1731
PALERMO.					
Cupola of S. Giuseppe	40	....	128	....	....
Cupola of S. Michele	35	3	60	10	....
LONDON.					
Cupola of St. Paul's	108	10	216	1	1710
PARIS.					
Cupola des Invalides	80	6	173	8	1704
Cupola of S. Genevieve	66	10	189	11	1790

The names of the different cities are arranged according to the earliest period at which the construction of the edifices they contain were commenced.

form and disposition, to produce, not only beauty in their interior, but also that magnificence at their exterior, of which the antique temples have left us such imposing examples. In concluding this article, it will, perhaps, be no less interesting than useful to present a comparative table of the different heights and diameters of the most celebrated antique and modern cupolas.

METHOD OF TRACING THE COMPARTMENTS OF CUPOLAS.

PLATE LI.

From the centre A, fig. 1, describe the arc BDC likewise from the centre A, fig. 2, trace the plan BC, and determine the number and proportion of the compartments and their intervals, which must be prolonged to the centre A; afterwards trace the intervals, or horizontal divisions BP, QV, &c., fig. 1, which, by drawing lines from each of these points parallel to the line AD, and being prolonged to the line AB, fig. 2, will give the circular divisions in the plan. In like manner the curved lines in the elevation are obtained, by raising perpendiculars from each determined point of the lines in the plan which tends towards the centre, bisecting the horizontal lines of the elevation. Fig. 3, is a development of the proportions of the ornaments and intervals of the compartments. For the details, *see* pl. 55.

OF DECORATION

If architecture be examined, independently of the science of building or construction, it presents itself to our view under the special relation of decoration. Indeed architecture, when thus considered, is the art of embellishing constructions, and of creating pleasure to man, through the medium of the forms commanded by necessity. To accomplish this, it employs two principal means. The first of these is the art of proportion, the second that of ornament.

Although proportion is the first, and one of the most sure means that architecture employs to create pleasure, yet, as it requires considerable knowledge to appreciate the just proportions of approximate forms, the effect produced will be dependent on the understanding of the observer. Indeed, though there can be no judicious decoration without proportion, the latter is not ordinarily considered amongst the means to be employed in decoration.

The second means is the art of combining ornaments, and of disposing them so as to form a part in the general system, in the total, and in the particular qualities suitable to each edifice.

Such is the art of decoration. It presents an architect with means, by the judicious application of which he is enabled to give to an edifice a specific expression, and to inscribe upon it the character appropriate to its uses.

Independently of the resources which form an architectural ordonnance, decoration comprehends those which are presented by sculpture, and which

COMPARTMENTS OF CUPOLAS.

Fig. 1

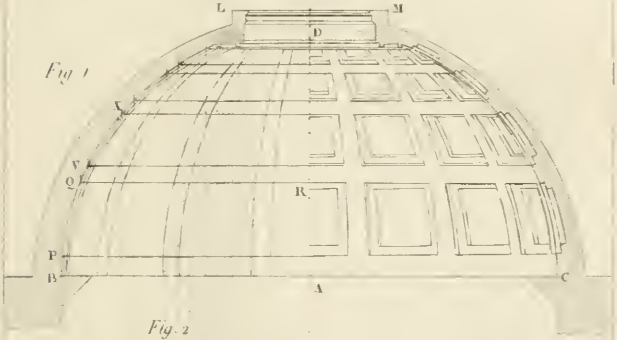


Fig. 2

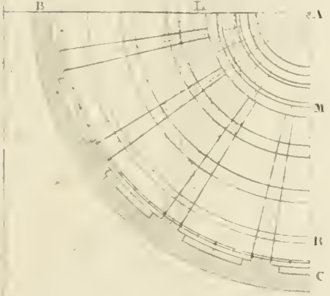
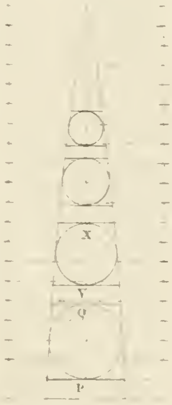


Fig. 3.



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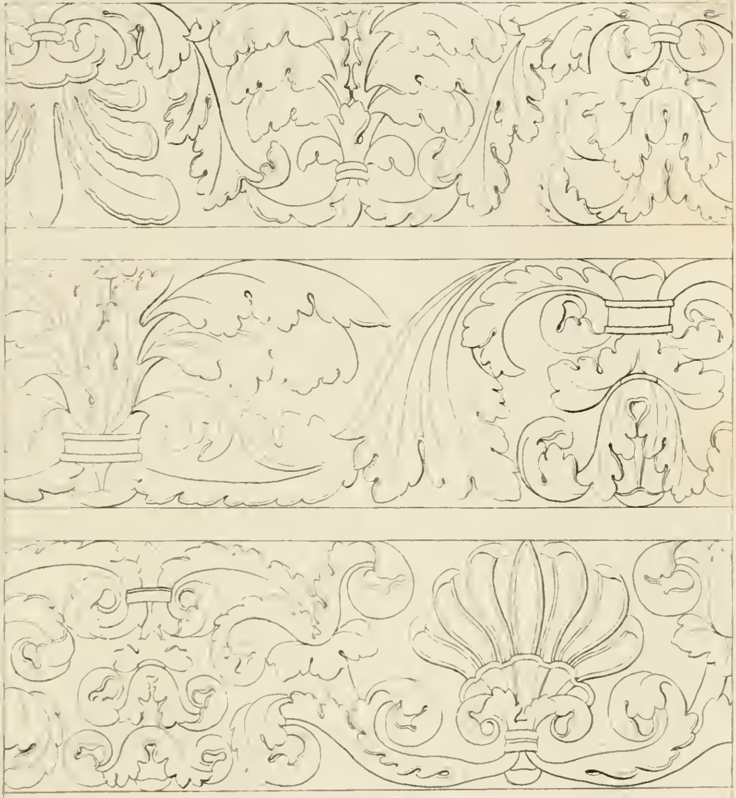
ORNAMENTS OF MOULDINGS.

CYMA



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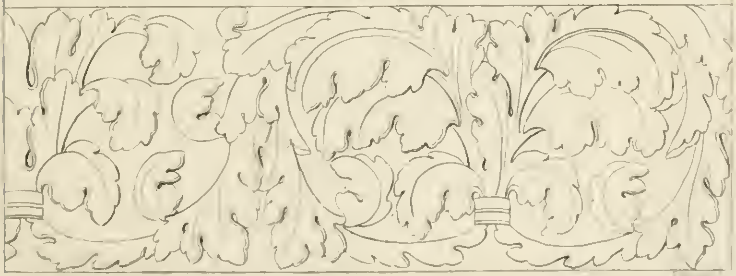

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ORNAMENTS OF MOULDINGS.

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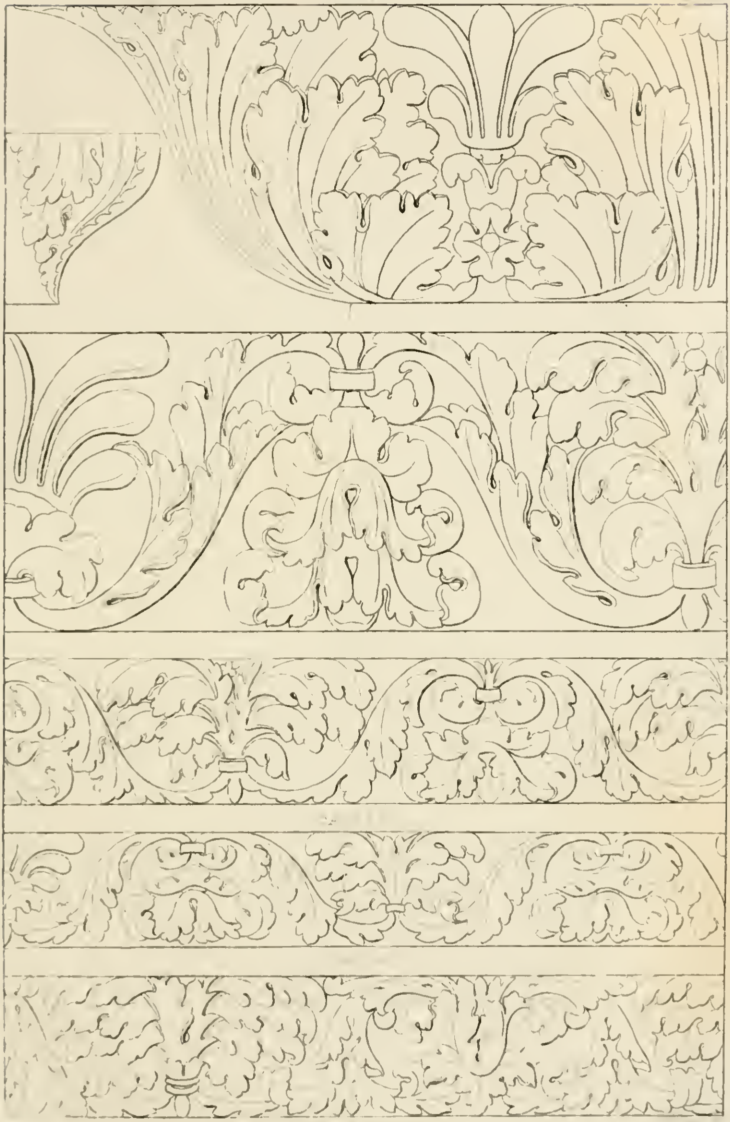
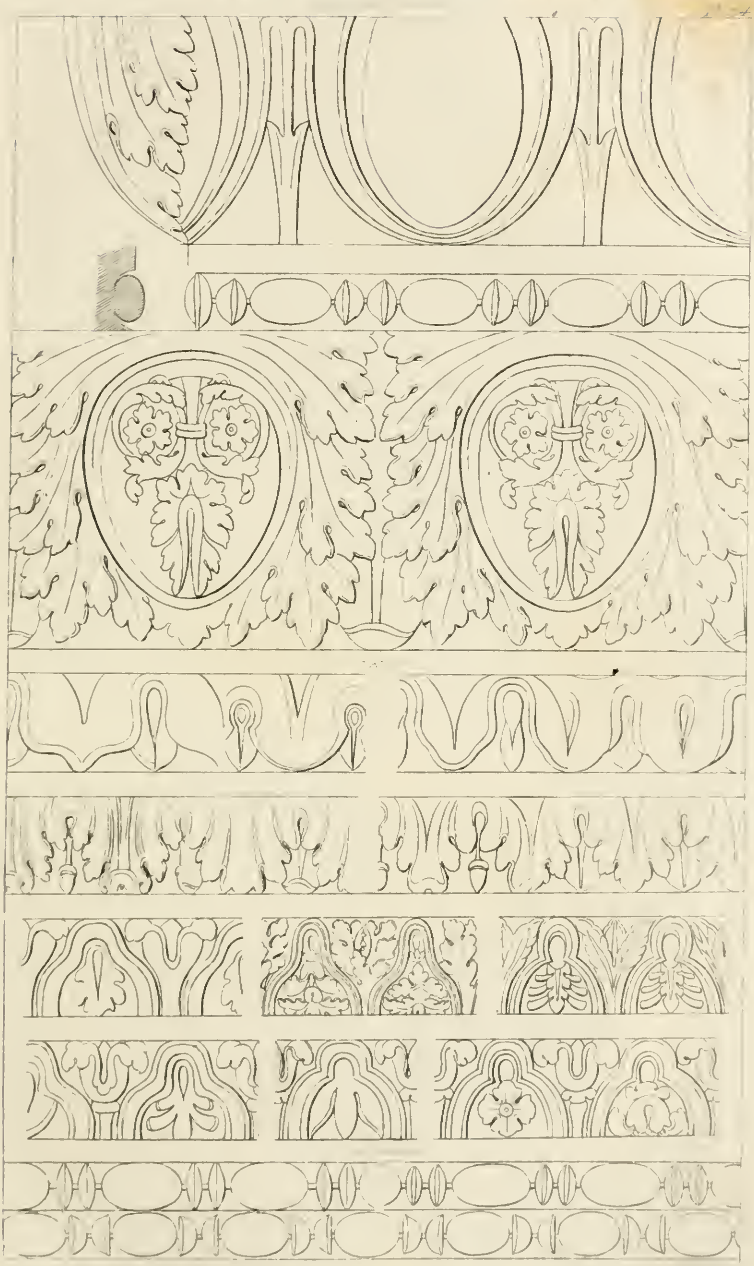


ORNAMENTS OF MOULDINGS.

Pl. 24



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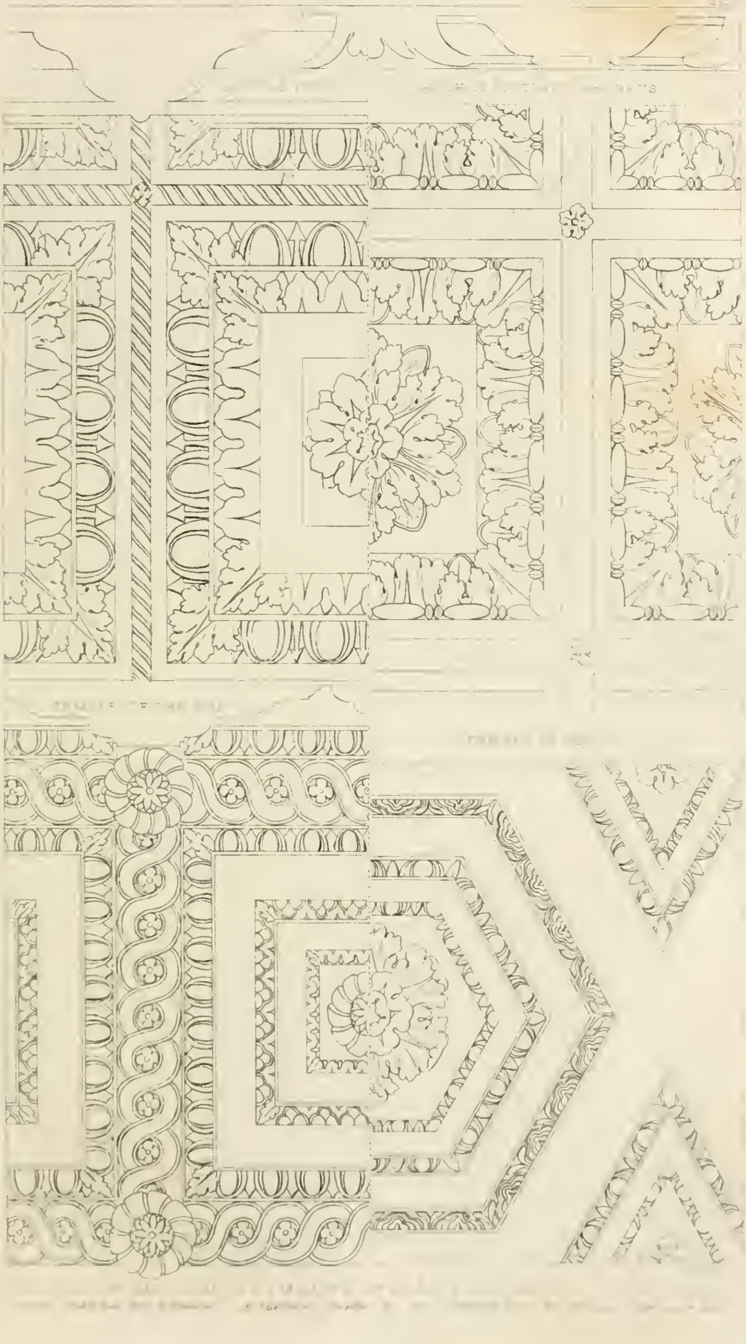
ORNAMENTS.



[illegible]

are equally applicable to the exterior and interior parts of edifices; and those which may be derived from painting. The resources of decoration are indeed so considerable, that they may be said to comprise even a part of the means employed in construction, and to exercise some degree of power over the quality of the materials.

But all these means, far from serving to characterize edifices, or to make their uses distinguishable, become only the instruments of confusion, if their application be not directed by an enlightened understanding.

Decoration in itself is the art of appropriately employing the ornamental resources of architecture; and as richness in architecture is one of the signs representative of power, greatness, and majesty, to employ the same species or proportion of richness or decoration to all edifices, would be a manifest and glaring impropriety. It must be evident, therefore, that an architect is not at liberty to employ these resources indiscriminately; and that the nature of each edifice indicates the kind and the proportion of decoration which appropriately belongs to it.

Considered in its partial resources, or in its details, decoration is a language the signs and expressions of which ought to present a precise signification, capable of conveying to the mind the intended ideas. Without this, it forms but an unintelligible jargon, composed of puerile and insignificant formules, or of signs that are mute to the mind; the capricious and fortuitous distribution of which is calculated only to attract the sight, at the expense of shocking the understanding.

It is in vain that the artist possesses the most

energetic means of expressing his ideas, and of giving to his edifices a species of visible, though mute eloquence, in the resources of decoration; unless he endeavours to attain that intelligence, which is requisite to profit ably by those resources.

The origin of decoration, taken generally, may be deduced from the passion for variety, and that admiration of beautiful forms so natural to man, which impelled him to devise the means of multiplying and varying his sensations, and consequently of increasing the sources of his pleasure and happiness.

The utility of decoration becomes manifest from a consideration of the necessity of characterizing edifices, according to the ends for which they may be designed. To construct a prison and a palace alike, is an absurdity that needs but to be mentioned to be admitted; and to say that because the decoration and construction of the one is characterized by largeness of division, and whatever may contribute to the appearance of strength, &c., the other ought not to be characterized by elegance of form and proportion, and richness of decoration, would be to deny the utility of architectural character in buildings, and to destroy one of the most classical sources of pleasure which this art possesses. Hence two general rules may be inferred. First, that decoration ought at least to appear necessary. Secondly, that it ought to employ only such objects as are in relation with the general design to which they are applied.

In saying that decoration ought at least to appear to be necessary, is meant, that all the parts of edifices cannot be considered as being alike susceptible of receiving ornaments.

By a necessary decoration is understood, that just application of ornaments, the absence of which would produce a vacancy in the mind; and the presence of which tends to express the nature of the object to which it is applied, by developing its character, in a direct appeal to the sense of sight. It derives the motives of its inventions or combinations from the particular properties of that which it is intended to embellish, or from the circumstances relating to them; and it draws its objects, and the necessity of varying them, from three sources, which it is important should be well understood; namely from the passion for variety, from analogy, and from allegory. Indeed, in the decoration of the antique architecture, which of all others is the best systematized, there may be found a considerable number of forms and details for which no other apology can be offered than that of the pleasure which is produced by the variety. There is an effect which ornaments of all kinds produce in architecture; it is that of multiplying and of strengthening the impressions which they are capable of exciting in the mind, by the variety in their forms and application. These impressions depend on the qualities which are developed in decoration, and which may be reduced to those of greatness, harmony, richness, and variety. Indeed, it must be evident, that the absence or presence of ornaments in architecture, like colours in painting, modify the appearance of the total; and give to an edifice all the variety of expression that our minds are capable of receiving. The disposition of the objects employed in decoration, is another means which contributes to the production of agreeable sensations. A judicious arrangement of

decorative objects, resulting from a correct taste in forming combinations, and an adequate conception of order and harmony, cannot fail to produce corresponding sensations in the mind of an observer. The details of ornaments form so important a part of the pleasure which results from a perfect accord in an architectural composition, that the effect which would otherwise result from correctness of proportion and harmony of design, may be totally destroyed by the confused application, or the injudicious employment of decorative objects. There are many edifices which would be acknowledged as good architectural productions, were they stripped of their decorations; and those decorations replaced by others chosen with judgment, and applied with taste. A beautiful edifice may be defined to be an object of harmonious relations of order and disposition. It is essential, however, to its correctness as an architectural production, that its ornaments be in unison with the order according to which it is constructed; and it is therefore important to bear in mind that each of the orders has its appropriate ornaments; the character of which corresponds to that of its form and proportion. The Doric order, which expresses strength and simplicity, will in some instances, admit of ornaments being placed on the contour of its capital, on its frieze, and on different mouldings of its cornice; but they must partake of its general style and proportion. The Ionic, which from its proportions, forms, and modinature, is considered as the medium order, admits of the application of a greater number of lighter and more varied ornaments on its capital, and the mouldings of its entablature. The Corinthian, by a more abundant and

diversified employment of all the details of ornaments, on its base, capital, and the other parts of its ordonnance, establishes such an accord between its proportions and forms, that gives it the property of expressing the qualities of richness, lightness, and magnificence.

Sculpture is the great means which architecture employs to decorate its productions. The ornaments which are applied to the different parts of an edifice by this means, may be divided into two kinds. The first consists of compartments, which may be subdivided into large and small, of which the former are panels of considerable dimension, arranged with others that are smaller ; the latter is a compartment of much less extent than the former, containing a rose, or other ornament, conformable to its figure ; and which occupies the centre of the first It may be employed in the form of a square, lozenge, pentagon, hexagon, octagon, or circle ; and the larger compartment may also assume an equal variety of forms. Pl. 55 presents examples adapted both for flat and cylindrical surfaces, together with the details of sculpture applicable to this description of ornaments; the enumeration of which may be concluded by referring to pl. 2, fig. 11 and 12, for examples of those applicable to the soffits or platbands of architraves ; and to pl. 21, for those to the soffits of cornices.

The second kind of ornaments may also be divided into two species. The first consists of posts, or scrolled foliage, composed of acanthus leaves and flowers, with which genii, tripods, or animals, are sometimes combined. These ornaments are generally applied to the frieze of the Ionic and Corinthian entablatures. To

this species likewise belong festoons and garlands, composed of flowers and fruits; which may be employed either together or separately. Sometimes they are simply formed of oak or laurel leaves. Festoons and garlands are applicable to the same parts as scrolled foliage, and may be also adapted to decorate some portion of extensive plain surfaces, such as the faces of walls. This first species of the second kind of ornaments, may be terminated by adding the roses applied to the compartments of ceilings, those which belong to the abacus of the Corinthian capital, and the culots, or masses of upright leaves; whence the different foliage, in general spring, and may be applied according as the nature of the compositions appear to require them. The last species of ornaments of the second kind are, acanthus, olive, and water-plant leaves; which possess the particular qualities of not materially altering the forms of the mouldings to which they are applied; and are the cyma, cavetto, and sometimes the talon. This latter moulding is occasionally enriched with trefoil, and flower-work, with water-plant leaves. The quarter-round is generally sculptured in oves, or other ornaments presenting a similar appearance, which are ordinarily separated by darts, and on some occasions by small flutings. To the astragal, chaplets or beads are commonly applied, the forms of which are susceptible of a very great variety. The pine apple is the last description of ornament belonging to this species, and is employed to detach dentils at their angle or return.

It may easily be conceived that it is neither possible nor necessary to give a more particular definition of each of these ornaments, the form of many being

sufficiently designated by their own denominations; a knowledge of which will be more easily and effectually obtained by an inspection of the examples presented in pl. 2, fig. 13 and 14; and pl. 20, 21, 38, 39, 52, 53, 54, and 55.

Independently, however, of the possibility of assigning any particular origin to some portion of these objects, or the reason of their employment in decoration otherwise than from the passion for variety; it is, nevertheless, required from the artist, that he be capable of making their utility apparent, in the effect which they should produce in the total of architectural compositions. If, therefore, the application of these different ornaments be not guided by judgment, and a proper consideration of the relation which ought to exist between the extent of their employment and the destination of an edifice, the true expression of the character of the total will be proportionately injured; and consequently the general effect, which might otherwise result, be destroyed In order to perfect its decorative language, architecture is obliged to draw upon another source; and to increase its means of expressing character by an appeal to analogy. The aid of analogy, however, could only have been called in after a considerable diffusion of knowledge, as it was necessary to understand this analogy, or it would fail in its intended effect. This was not the case with simple variety. The language of analogy is progressive in its nature, and is not the same in all countries, as it has its origin in the connexion which exists between certain forms and the purposes to which they have been, or are, usually applied. The gloom of a prison is proverbially and inseparably connected with massive

walls and imperfectly lighted apartments; whilst ideas of pomp, magnificence, pleasure, and gaiety, are as inseparably connected with the elegant form and proportion, and the rich decoration of a palace. The idea of pleasure on the one hand becomes associated with edifices of elegant form and proportion, richly decorated, and beautifully executed; whilst on the other, the rough-hewn massive walls of a prison are associated with misery, affliction, and gloom. Between the two extremes, a palace and a prison, there exists many grades—to characterize which appropriately, will call forth the judgment of the artist. If it be required that an edifice should express one of the intervening qualities, such a disposition of the parts must be adopted, and such ornaments chosen, as are in unison with the intended effect. The employment of such ornaments as present the most finished execution, and are light in their details, gives rise to that idea of richness, which is a never-failing source of pleasure to the beholder. If, on the contrary, the intended effect be that of resistance or strength, few ornaments must be admitted; because that division of the parts which results from their employment weakens the idea of strength, and sometimes also reduces that apparent solidity which is necessary to its character. The only ornaments admissible in this case are such as present but few details, or that appear to be principally dependent on the construction itself.

The objects of decoration, drawn from the analogy of the primitive constructions of necessity, have in the commencement of this work been sufficiently made known, and therefore require no farther enumeration.

The bases, shafts, and capitals of columns, parts of the entablature, soffits or ceilings, and pediments, bear with them such incontestible marks of their origin, as not to require further proof. Thus modinature forms a very important part of architecture, as also one of the bases of decoration, proceeding from the system of analogy, which constitutes the principle of imitation in the art.

It is doubtless possible, by the scrupulous employment of the indicative types of the origin of the art, to join all the variety that the taste of decoration requires, and, without altering their forms, to multiply, almost indefinitely, the shades of character which each edifice ought to receive. The system of architecture, and its division into three styles, proves how capable the forms of necessity are of admitting in their decoration a well-characterized expression—how well they are adapted to receive a progressive gradation of richness or simplcity, of variety or uniformity. This constitutes a very intelligible language, the value of which is proportionately enhanced when the artist knows how to express his ideas, and the spectator is able to comprehend them. Ornaments, in the sense in which they have been hitherto considered in this article, are particularly composed of objects sculptured upon mouldings and profiles, and those which are applied to the surfaces of the principal forms of architecture. The effect, however, may be considerably modified in the execution of these kinds of ornaments. They are a species of characters, the expression of which sculpture is enabled to render more or less striking, by giving to them, in the execution, more or less projection; tracing them lightly or deep, or

exhibiting in their contours a greater or less degree of sharpness, and consequently detaching them with more or less vivacity. Thus all the different shades which may be produced in their effects, contribute, in some measure, to the expression of character. In the execution of ornaments, it is also essential to take into consideration the dimensions or extent of the edifice, and the distance of the parts, intended to be sculptured, from the sight. There is a soft and light, strong and deep, a rough and a finished manner of executing ornaments, which is governed, like that of statues, by their dimensions and the point of sight.

Another great source whence architecture has enriched its decorative powers, and draws its most numerous and best adapted means of hieroglyphic expression, is allegory.

Allegory is the simple and natural language of the imitative arts, which convey their meaning through the medium of signs and figures. From the application which architecture makes of this language of the arts, and the symbols which it affords, the most abundant means are obtained of giving to the decoration of edifices, as determined a signification and distinct property, as is possessed by each of the arts from which those means are drawn.

The resources which allegory presents in decoration, are such as enable an architect to characterize all species of compositions by its symbols. It is in its decorative appropriations that architecture becomes a powerful auxiliary and handmaid to history. It explains thereby the general and particular object for which an edifice was destined ; informing us of the moral or physical purpose for which it was employed.

Allegorical decoration is more expressive than all the inscriptive matter which it may be possible to make use of.

When the suitable compositions employed in the decoration of an edifice have been drawn from allegory, we are enabled even from its ruins, to discover its original destination. How many of the antique edifices would have sunk into a nameless oblivion, and their destination have remained for ever unknown, if some fragments of their allegorical decoration, found amongst their remains, had not explained to us what they were, and the uses for which they were employed! The principal objects made use of in allegorical decoration, whether employed by means of painting or sculpture, may be divided into three classes. The first comprehends attributes, the second is composed of figures, and the third embraces subjects of composition.

Under the name of attributes are comprehended all the symbols and emblems, rendered visible by means of painting or sculpture; which become, by their conciseness, a species of monograms in the figurative composition of architecture. At the head of attributes may be placed the greater part of foliage and plants, which form so important a feature in the composition of ornaments. It was from the religious ceremonies of the primitive race, from their desire to deck and embellish, by the productions of nature, the constructions dedicated to their deities; and also from the offering of fruits, plants, and roots, at their oblations and sacrifices; that the greater part of compositions presenting scrolled foliage bearing fruits and flowers took their origin. It would be difficult to contradict

such an etymology, since even at the present period and in the midst of an artificial luxury of decoration in edifices, the natural decorations just mentioned are employed in civil and religious *fêtes*. Thus garlands, festoons, flowers, wreaths, and the foliage of capitals, owe their origin to the same source. Each of these objects may, as an attribute, or emblem of a known and expressed custom, be employed in decoration with a special and characteristic signification.

The instruments of sacrifice, ornaments of the sacrificer, sanctified vases, heads of the animals sacrificed, fillets, pateræ, and all those objects that were employed in that part of the worship of the ancients, have been transmitted as attributes in the decoration of sacred edifices. Architecture has made conventional signs of all these emblems, which, notwithstanding the differences of custom adopted in modern worship, are no less received as a metaphorical means of indicating the destination of the edifice to which they are applied.

Among the ancients, each divinity had its particular attributes. Indeed, the divinities were but a species of attributes expressive of the different properties of nature, or the physical or moral relation of things. Although there is no longer any faith in the powers of Jupiter, Venus, Neptune, Nymphs, Diana, Apollo, the Muses, and the other figurative beings, the ideas attached to these allegorical forms, and their relations to the different qualities, &c., of which their names and figures are the representation, cannot be dispelled. The attributes which form their retinues, have, indeed, long been admitted as so many devices or emblems, which constitute the figurative language of the imitative arts. Architectural decoration, above all, profits

by them to characterize its productions. The eagle and thunderbolts were, with the ancients, the symbolic representatives of eternity and almighty power; the myrtle-branch and the dove characterized affection: the lyre and the laurel-branch were the symbols of harmony and of fame; and the employment of shells, dolphins, &c. in an edifice, indicated its devotion to aquatic purposes. The helmet and lance were the symbols of war; the palm-branch and wreath announce victory; and the olive, peace. The balance is the natural and beautiful representative of justice; the quiver and arrows, the synonyms of Cupid; and the serpent, of Æsculapius. Ears of corn, of Ceres; the owl, of Minerva; and the cock, of Mercury; who were themselves considered as the presiding divinities over abundance, science, and vigilance.

The instruments belonging to the arts and sciences, are all objects which may be employed, as the natural ensigns of those purposes for which an edifice may be destined. The matter that the combination and employment of attributes affords to decoration, is as varied as it is extensive. They may be changed, modified, and reproduced under different forms, by the genius of the artist; taking care not to sacrifice the clearness of their expression to novelty of combination. There is in this respect a medium to be observed; so as not to present to the sight enigmas in place of inscriptions. There are certain given forms and acknowledged attributes which require to be judiciously applied; as well as precedents which it is necessary to respect. But the most essential thing in their application, is, that the greatest possible judgment and discretion be observed in their distribution; and

in the choice of them, as regards the relation which they bear to each other. How inconsistent it must appear to apply sphinxes to a fountain, to throw out water; trophies to a monument, not triumphal; or the symbols of the arts, and those of the virtues, to places serving as receptacles for neither art nor virtue! Indeed, the inconsistencies which have been, and even now are practised, in the decoration of modern architecture, are almost innumerable.

The second class of objects which architecture employs in its allegorical decorations is composed of figures. Figures may be considered either as relates to the subjects that they express, or the manner in which they are emyloyed. Figures, with respect to the subjects intended to be expressed, may be divided into two kinds, simple and composed. Composed figures are those which have taken their origin from the hieroglyphical style of writing, and were originally figures of objects, serving as real characters; but which, by an early license, were transmitted into architectural decoration, although their literal value was lost. It is named the arabesque style, and is for the greater part composed of capricious, fantastical, and imaginary objects, represented in architecture by painting or sculpture, and employed in the decoration of walls, panels, sides of doors, surfaces of pilasters, friezes, and sometimes to the soffits of flat and cylindrical ceilings. This style consists of three things which are very independent of, and present themselves in a distinct manner from, each other.

The first comprises those representations and architectural compositions, the irregular and capricious forms of which are mostly taken from oriental monu-

ments and edifices, and were introduced into decoration amongst the Romans, as the absurdities of the Chinese have been introduced into this country.

The second is composed of all kinds of figures, and imaginary animals; having the head and foreparts of one species of animals joined to the body of another; of which sphinxes are examples. Such forms served, in the early ages, as signs of a language; or the allegories which they represented belonged to the dogmas of the Egyptian and oriental mythology.

The third comprehends scrolled foliage, festoons. leaves, and other similar objects; invented by the Greeks and Romans, and employed by them in their edifices, either by the means of painting or sculpture.

The most numerous examples of this species of architectural decoration, as practised by the ancients, are those presented in the remains of the thermæ of Titus, and those at Pompeii. Almost the whole of the interiors are decorated with views and perspectives of edifices; the singular forms and compositions of which, instead of having excited researches into their true cause and origin, have given rise only to erroneous opinions, and strange conjectures.

The Romans, like all nations habituated to luxury, sought pleasure in the novelty and variety produced by differences in style and taste. Yet this is certain; that they never extended their caprice, as has been practised in this country, to such acts as those of realizing, in a durable manner, designs of edifices presenting the most barbarous styles; the contrast produced by which would have been considered by them as too revolting.

The most severe critic can find nothing to condemn

in that description of arabesque which is composed of scrolled foliage, leaves, and running ornaments; the origin of which can only be attributed to the same causes as ornaments in general. The best examples of this kind, executed in painting, are those of the thermæ of Titus, and those at Pompeii. Those executed in sculpture, are the face of the pilasters of the arch of Pola, in Istria; the arch of Titus, at Rome; and the fragments of the villa Medici. These examples are models of taste and execution, in which the artist will always find fresh resources for the embellishment of his edifices. Such compositions as the foregoing should not be confounded with those so justly reproved by Vitruvius, which present an extravagant compilation of objects, composed of unnatural forms. After having spoken on the taste of the ancients in decoration, who, in all subjects of painting, represented the objects as they naturally were, this author remarks, "I know not from what caprice the rule which the ancients adopted is not still followed, of always taking such things for models as are consistent with nature. For the paintings that are at the present time executed upon walls, instead of forming real and regular imitations of objects, present nothing but extravagances. In place of columns, reeds or stems are substituted, bearing interwoven fluted branches of plants, and having their leaves divided and turned in imitation of volutes. Small temples are placed upon the summits of candelabra; whence, as if they had roots, scrolled foliage rises, upon which figures are seated. In other places flowered work is represented as connected with half figures: some of which bear the heads of men, and others those of

animals; which are things contrary to the laws of nature. Such is the power of habit or mode, whether it proceeds from indolence, or from want of judgment, that the greater part of mankind shut their eyes to the true principles of the arts. For how can it be supposed that these reeds sustain a roof; that the candelabra support an edifice; that weak branches bear figures; or that half-formed figures could spring from stems, roots, or foliage? Notwithstanding their inconsistency, no one corrects these impertinences; on the contrary, they are encouraged, without questioning their consistency; so little are the generality of minds capable of judging of that which merits to be approved and authorized. For myself, I think that painting ought only to be esteemed in proportion as its representations are natural and true; that it is not sufficient that the execution be good; but it is also necessary that the design be reasonable; and that it present nothing to shock the understanding."

In this passage, Vitruvius has defined the nature of arabesques, in as correct a manner as he has also indicated their origin and history. From it may be perceived, that this style, which was introduced at the period at which he wrote, had not as then attained that point of perfection, for which it was afterwards distinguished. Nevertheless, when we reflect on the superiority that accompanied all sorts of decoration amongst the ancients, on the character of originality which they always presented, and when we examine the astonishing variety that the antique arabesques offer, their masterly execution, the charming details which they contain, the happy ideas and valuable analogies which they afford, it will be seen why the

minds of so many able men have been led away by them. Nor will it be difficult to discover, why the greatest man of whom modern painting can boast, did not judge them with so much severity as Vitruvius.

About the fifteenth century, when the arts had reached a higher degree of perfection than they have ever since attained amongst the moderns, Raphaello, on the discovery of arabesques, presented in the fragments of the thermæ of Titus, though they offered but a sketch of antique painting, discovered therein what was sufficient to inspire a mind so acute and penetrating. He succeeded in restoring and redeeming the taste of decoration; and all the details of ornaments condemned until then to the arid monotony of the Gothic. The secret of stuccoes was discovered; the preparations of the ancients reappeared; and arabesques were employed in the decoration of the most magnificent palaces. This style, executed by Raphaello, guided by an exquisite and delicate taste, and aided by his able co-operators, who prided themselves in being his disciples, could not fail to obtain that reputation by which it was distinguished amongst the ancients as well as amongst the moderns.

Raphaello has had many copyists in this branch of the art, but not one successful imitator. The best modern examples of arabesques in Italy are his productions, or those of his school. Such are those of the Doria palace, at Genoa; Cancelleria, Villa Lanti, and the Villa Olgiati at Rome; with several others.

The arabesque style ought to be governed in its caprices, so that the union of things possible and impossible form not too striking contrasts. Arabesques should be employed in the decoration of superfices, or

apartments, which are only of medium dimensions. When applied to immense surfaces, this style loses all the effect of its details, and that species of verisimilitude which is not objected to when on a lesser scale; without however being able to attain the propriety, harmony, and just relation which the decoration of large apartments requires.

Arabesques should never be employed in the decoration of any situations that require solemnity, and ought to inspire respect; as this style presents a diversity of discordant subjects and objects, which are incompatible with such sentiments. It is in small apartments that the application of its resources are best employed. In such situations will be found, by means of ingenious compositions, suitable occasions for the display of the most varied motives. Allegory furnishes it with inexhaustible means, by the metaphorical decoration of each apartment, and the dedication of it to the divinity that presides over the use to which it is applied. The different emblems of sleep, Apollo, Bacchus, the Muses, &c.; the plants which are consecrated to them, their attributes, which together with the animals, birds, and insects, that bear an affinity to each of these deities, ought to be distinctly and separately represented in each apartment; indicating the reigning subject and proper character of the locality; the appropriate use of which is intended to be expressed.

This manner of decoration has the advantage of being adapted to the irregularity and disproportion of apartments. In the hands of an intelligent artist, it seldom fails in concealing the most striking and disagreeable forms; and it affords the means of decorating

any surface. If the height of the part to which it is intended to be applied be not of a suitable proportion, it may be subdivided, so as to reduce it to a more apparent relation with its length. If the length of the apartment be too great for its height, this inconvenience may be remedied, by dividing its length according to the proportions prescribed by the least spaces; which will form those of pilasters, friezes, and panels.

The last permit of being filled, either with figured drapery, or with round, oval, or square forms; that receive paintings attached from space to space by ribands; or by draperies forming folds at each part from which they are suspended. By these means a regularity of proportion, and also a symmetry of design, may be given to apartments. The vacant spaces will permit of the insertion of rising ornaments composed of leaves, flowers, branches, &c., executed either in painting or sculpture.

This style of ornaments requires the greatest care on the part of the artist, both as regards composition and execution. When scrolled foliage rises to the height of from ten to twelve feet, it is necessary to avoid gaining that elevation at one cast, or from one point at the lower extremity; and to distribute the height into three parts. The stem should be of such a sufficient consistence, as reasonably to produce all that may be introduced along the surface until it reaches where it is divided by means of a cameo, or by a painting; the total should be terminated by objects bearing some analogy to the rest.

It should be observed, not to make the scrolled foliage too rich or too heavy; as flowing forms and simple contours constitute its greatest merit. The

different branchings or ramifications which may be introduced, to give variety to a composition, should be motived and authorized; the parts ought to follow each other, and be naturally introduced, making the reason of their situation evident. The choice of leaves may be ranked among the means which afford the greatest abundance and variety of contours, and of striking effects. Such are the wild acanthus, artemisia, matricaria, hemlock, large parsley, &c.; all of which produce sharp outlines and effective touches.

In the employment of these leaves, it is necessary to study the natural order and gradation of their masses. The first masses should be small, the others successively increasing as they approach the centre, afterwards diminishing as they reach their extremities, which should be weaker; it being requisite that the stronger bear the weaker parts. The imitation ought to be sufficiently perfect to make known the different plants which have served as models to this style. Although such licenses may be taken in their execution as characterizes this branch of decoration, yet from this departure from a scrupulous imitation of nature, one of the greatest pleasures which their employment is capable of producing, is lost.

The details of the arabesque style are so numerous, the combinations by which they are modified so various, that the precepts of taste in their employment might almost be infinitely multiplied. The greater part of them being common to the other branches of decoration, they will be found treated upon in the different parts of this article. But it is harmony, that great principle of the arts, which ought to be most observed in the composition, execution, and arrange-

ment of arabesques. This harmony may be divided into three classes; namely, the harmony of ideas, of colours, and of masses.

The harmony of ideas, in the unity of motive or design, in the intelligence of the details, the intellectual relation of each of the parts, and the concert of all the attributes and accessories; which, when guided uniformly towards the same end, gives to this style a forcible symbolical expression.

Harmony of colours results from a skilful accord of all the parts which form the composition and grounds presenting a variety of colours; the agreeableness and mellowness of the tones, judicious introduction of stuccoes, bassi-rilievi, scrolled foliage and figures; and from the manner of executing them according to the situation, effect of the light, and the distance of the objects.

Harmony of masses is that which presides most predominantly in the arrangement of arabesques; it consists in the distribution and employment of the parts, so as not to let too great a portion of the ground be perceived, or unequally covered. It is from this judicious disposition of the lines, that arise the agreeable impressions afforded to the sight; the execution presenting nothing either wanting or out of place. That part of arabesques, of which the scrolled foliage of the ancients offers the most beautiful models, is the most difficult; and but rarely introduced in modern arabesques.

Simple figures, which constitute the second kind of the second class of allegorical objects, are those that possess an evident model in nature. It is in this class, more than in any other, that allegory becomes

unlimited. It furnishes decoration with matter which is as rich as it is inexhaustible.

To whatever use an edifice may be destined, or whatever be the style of its architecture, figures, if they be characteristic, will add greatly to its effect. A triumphal arch, entrance gates, theatre, hospital, market, fountain, palace, church, &c., are all susceptible of receiving allegorical motives or designs.

Simple figures, in decoration, comprehend bassi-rilievi, together with figures in rilievo, as statues. The latter are too generally considered as objects purely decorative. Niches, pedestals, and colonnades, in which statues are placed, are often employed merely to give effect to a composition ; without the least question as to the propriety of the subject of the design with the use of the edifice. The application of statues, as being one of the greatest luxuries of decoration, should be principally confined to public monuments, and public edifices.

The third class of allegorical subjects, or extensive compositions in painting or sculpture, has been the one most employed by the moderns.

It is not probable that the ancients ever introduced, in the interior decoration of their edifices, allegorical compositions of such gigantic dimensions as the moderns have. It is true that the ancients applied subjects in painting to the interior of their edifices ; but it may be affirmed, that they consisted only of such compositions as could easily be taken in by the sight, and as easily understood by the mind. They were by no means so extensive as those executed by the moderns, particularly in the decoration of cupolas and ceilings. These immense compositions have no other

value than the effect of the colours, and the deception of the perspective. In such applications it is indeed difficult to develop a correct taste, and the true principles of imitation.

The too great extent of a composition in painting, has the disadvantage of not being able to address the comprehension of the spectator. For how is it possible that the mind should be able to comprehend the total of a composition at an elevation of three hundred feet, and comprising also a circumference of three hundred feet? When it is necessary to represent objects at such a distance, it is better to employ simple allegorical characters; or the ornaments that architecture furnishes, as being more suitable to such situations.

Sculptured figures, and subjects executed in basso-relievo, have sometimes been introduced in the decoration of cupolas and cylindrical ceilings. Nothing can be more improper than this employment of sculpture, the heavy appearance of which seems to menace the safety of the spectator.

Sculpture, when injudiciously employed in decoration, is fatiguing; both to the sight and the understanding. Equally offensive are misplaced allegorical characters and subjects of composition; which, when applied with discretion, are invaluable to architecture, as being one of the most natural and appropriate means of decoration. The greater part of the antique edifices, and some modern ones, prove what a degree of expression may be attained in their decoration by means of sculpture in basso-rilievo.

The Greeks and Romans applied a considerable portion of the riches of sculpture to the pediments of

their edifices. The Parthenon, at Athens, has preserved some fragments of the decoration of its pediment; which exhibits to us an example of perfection in execution, united to greatness in composition. The metal cramps in the tympanum of the portico of the Pantheon, at Rome, indicates that its pediment was decorated with a basso-rilievo. The columns of Trajan and Antoninus, and the triumphal arches, may be further cited as varied examples of the inexhaustible resources of sculpture. These last-mentioned productions exhibit to advantage, the resources of the art as a medium of historical communication; its monumental inscriptions serving as records of past events.

There are three kinds of relief by which figures are more or less detached from the ground upon which they are sculptured, namely, the alto-rilievo, or bold relief; mezzo-rilievo, the medium or half-relief; and the basso-rilievo, or low relief; but each of these is at the present day indiscriminately termed a basso-rilievo.

Although the execution of this style particularly relates to sculpture, yet, from the frequent, necessary, and varied employment of it in architectural decoration, both internally and externally, it would have been a blameable omission not to have mentioned it in this article in its proper place. An architect, doubtless, stands in less need of being familiarly acquainted with all the details and precepts of execution in this branch of art than a sculptor; but, he ought not to be ignorant of the origin, nature, and correct rules of taste, which constitute the perfection of this part of decoration. By this knowledge he will be enabled to direct the sculptor in the form, disposition, and style, suitable to bassi-rilievi; according to the manner in which he

may judge requisite to employ them, and the accord which ought to exist between them and the ordonnance, conformably with the character of each edifice.

Amongst the ancients, bassi-rilievi were never employed independently of architecture. Whether this branch of art displayed its riches in the pediments of temples, or on the triumphal arches—whether it decorated the face of a frieze, or the more confined space of a metope, in its applicatian to pedestals and stylobates, vases, altars, and tombs, ornamenting their contours, designating their employment, or giving movement to their aspect, yet it will be found invariably to be subordinate to the architecture, or to the forms of the objects to which it is applied.

The principle followed in the application of bassi-rilievi to the triumphal arches is the same as that which is manifested in the construction of the Trajan column, and all other monuments presenting the same spirit of design. The bassi-rilievi employed in these examples constitute a long and visible narration of the actions of this emperor; they form an ocular recitative; a material and striking history of his actions and victories, The division which the historical sculptor should make of the portion of this style belonging to art, and that part of it which properly belongs to history, ought to be such as to induce him to regard his figures under a double relation; endeavouring to make them express the reason of their employment, rather than to draw admiration; they ought to instruct rather than please. He should make them speak to the understanding, in the clearest manner, all the language which they adopt; rather than employ his skill to render their contours more agreeable.

It should be observed, not to employ a multitude of ornaments around bassi-rilievi; as these attract the sight and attention from the principal subjects which they offer. If they are not insulated by means of a moulding, there should be an even surface left around them to give repose to the sight, and effect to their relief; likewise similar arrangements ought to be made between them and the different members of architecture. The proximity of the principal parts, the profiles and details, injures the effect of bassi-rilievi, and introduces discord in the total.

The relation of the proportions of bassi-rilievi, and the figures of which they are composed, with an ordonnance, is another point which ought not to be neglected by an architect. There might result, from this want of an exact and judicious relation, a striking disproportion in the whole of the composition. The figures in bassi-rilievi serve as a sort of scale, whereby to appreciate the different dimensions. The small or exaggerated size of the figures would render the appearance of the ordonnance either trivial or colossal; and by this means injure the proportions of an edifice, which in themselves might be beautiful.

The same may be said as regards the greater or less projection that bassi-rilievi ought to have. An architect ought to regulate it according to the degree of strength or delicacy of his ordonnance, greater or less expression of force and energy of the profiles, the general character of the style adopted, the point of view of the edifice, and also the situation of the bassi-rilievi; the light they may receive, the effect it is necessary to produce, and its accordance with the

reigning style of the ornaments, and the quality or value of the surrounding parts or details.

The rules of taste relative to a good and judicious employment of sculpture, whether allegorical or historical, in edifices, equally appertain to all the preceding precepts and observations.

The importance of this article, the subject of which constitutes a great portion of the art of architecture, will form a sufficient apology for its being so considerably extended. It shall, however, be concluded by offering a few remarks on decorative painting, and the imitation of all that is employed in the embellishment of edifices by that means.

This part of decoration consists in the imitation of another imitation. Indeed, if we except figures, landscapes, flowers, and some other objects which sometimes form a portion of the combinations of the decorator, the principal parts of this branch of the art consist in perspective or geometrical views of architectural ornaments in relief; of statues, niches, vases, altars, monuments, &c., produced by painting, under different forms. This imitative decoration has the same principles, and is governed by the greater part of the rules which are applicable to the original decoration, which serves as its model.

An architect, who ought always to guide the decorator, should only permit the employment of feint decorative architecture on walls and superfices; of which the point of view is common to a great number of spectators; admitting nothing in his compositions inconsistent with correct taste.

The decorator may be less restricted in the embellishment of the interior apartments and galleries, where

his art is not subjected to any pre-existing ordonnance. Under these circumstances, decorative painting has two different ways of employing its resources. It may either be considered as presenting architectural paintings, or as replacing the different parts of an ordonnance by an exact and deceptive imitation of them.

In the first, the decorator paints on the walls ideal views of edifices, representations of well-known monuments, or ruins. This part is dependant on painting, and enters into the ordinary rules of imitation. This species of illusion, which tends to conceal, by the effect of aerial and lineal perspective, the apparent consistence of the surface to which it is applied, is not suitable to all kinds of interiors, and would often be misplaced in the decoration of certain apartments; which, by being destined for important uses, require an expression of gravity. It is adapted for the decoration of dining-rooms, and others of a similar use.

In the second way, the decorative painter replaces, by the effect of imitation, the resources of real architecture. In place of columns in relief, entablatures, pilasters, niches, and real statues, all these objects may be executed in painting. This style of decoration is then subjected to the same rules of proportion and propriety as real architecture: none but an architect should conduct its execution. Its great merit consists in the purity of its forms, and the truth of its tones. This species of illusion, when well executed, will sometimes at the first glance deceive the most experienced eye. There are examples of this kind of deception, which are so ably combined with real architecture, that it is difficult to avoid being deceived thereby.

All the other objects of which decoration is composed, forming an assemblage of ornaments which, by means of painting, are employed to embellish edifices, too nearly appertain to the art of painting itself, to claim a more extended notice in this work. An architect should superintend each branch of decoration applied to his design; directing and making choice of such subjects as are conformable to the locality they are intended to decorate, and to the character of his edifice; so that the entire decoration of an edifice may present a harmonious conformity to the general design and taste of its architecture.

ON THE PRINCIPLES AND BEAUTY OF ARCHITECTURAL COMPOSITION OR DESIGN.

All edifices and buildings are destined for some use; and it is the apparent adaptation to this use, that constitutes their proper or relative character. This adaptation excites, and serves as a guide to the public mind, in estimating their value; and enables men to judge of the precise degree of importance of each to society. Nature has given to all its productions a peculiar physiognomy; which makes them distinguishable from each other, and serves to indicate their several properties. The mind of man naturally follows this general law, in the formation of a multitude of its productions; which though produced by necessity, yet make apparent the particular use for which they were destined. The effect of this law may be

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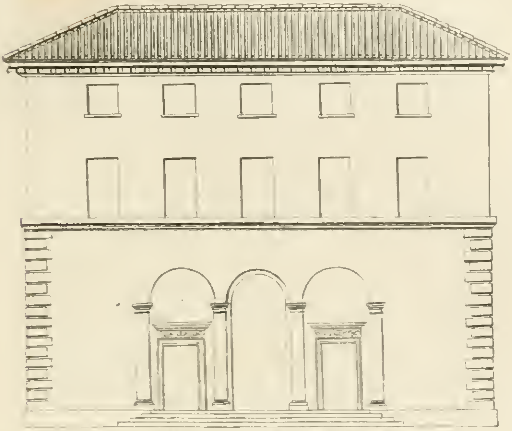

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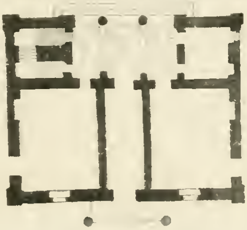

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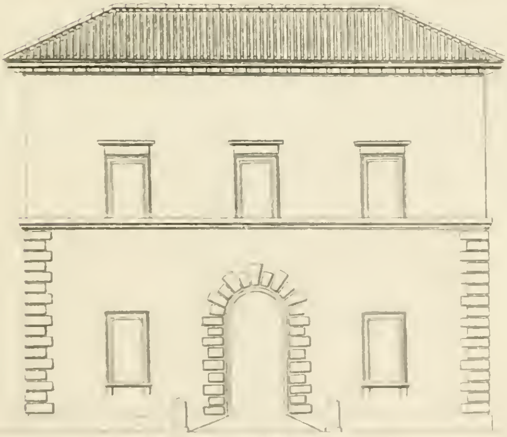

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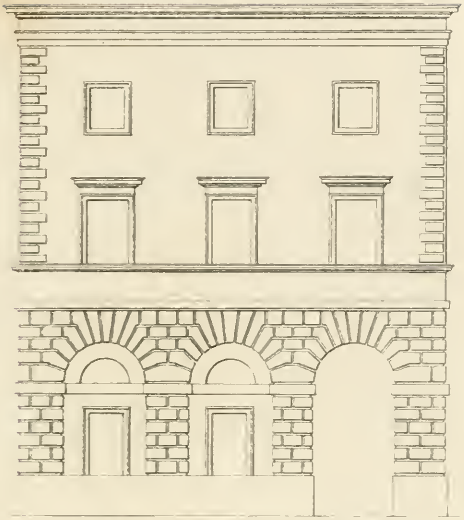

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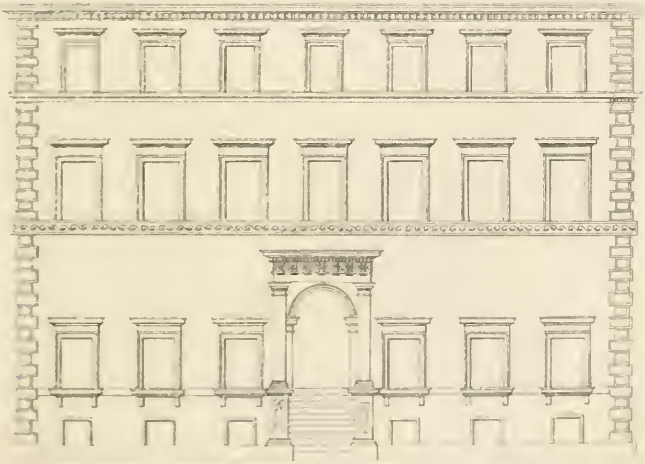

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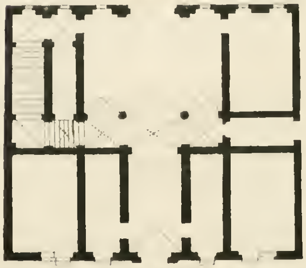

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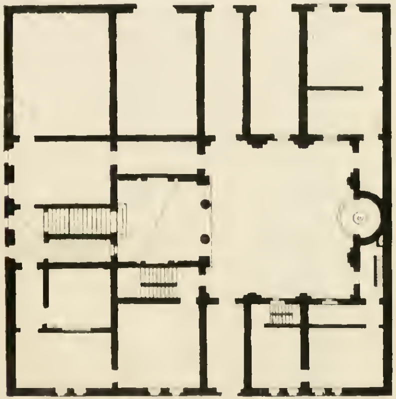

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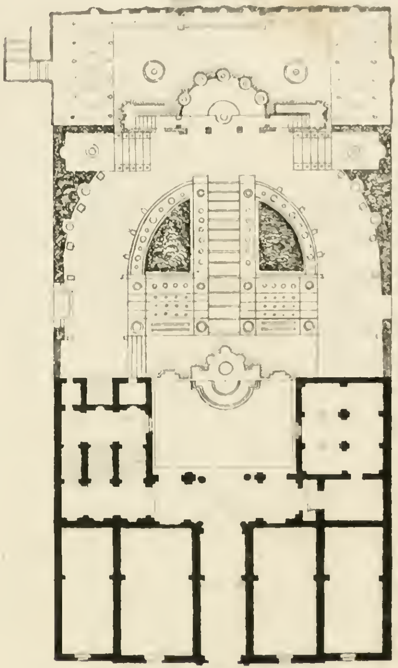

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ELEVATION OF A HOUSE.

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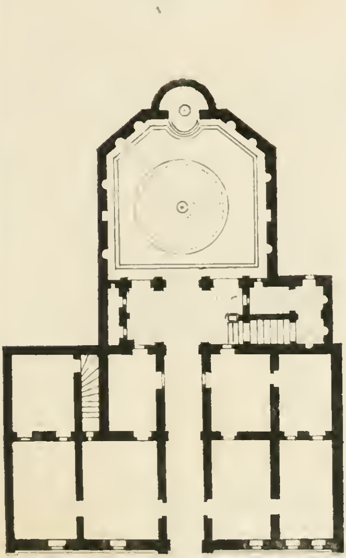
PLANS OF HOUSES.



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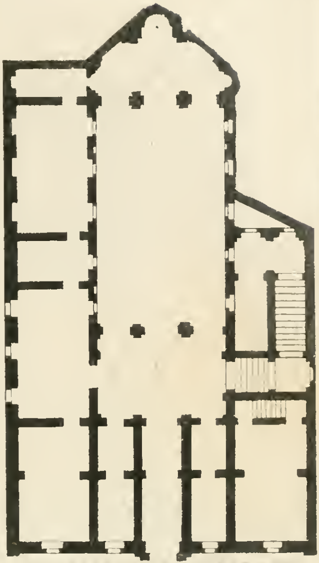

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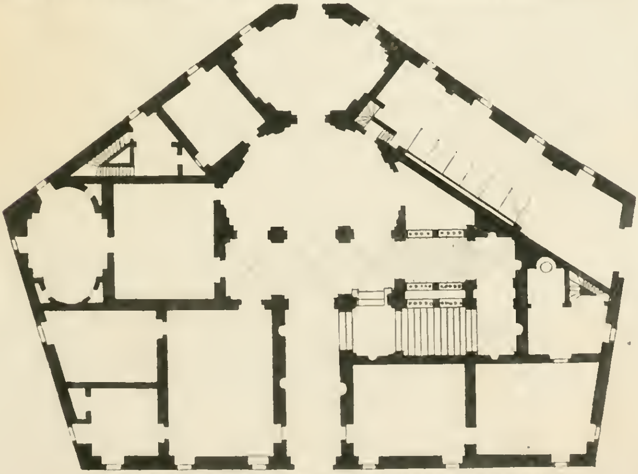

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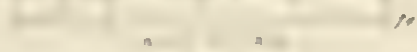

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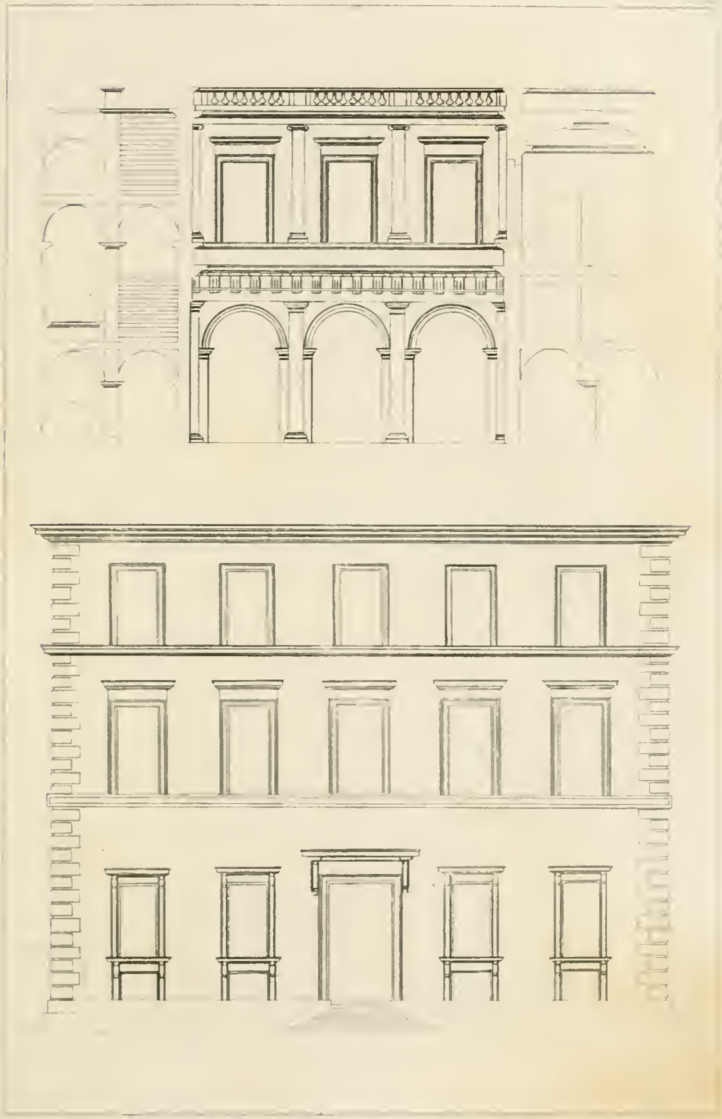
ELEVATION & SECTION OF A HOUSE.



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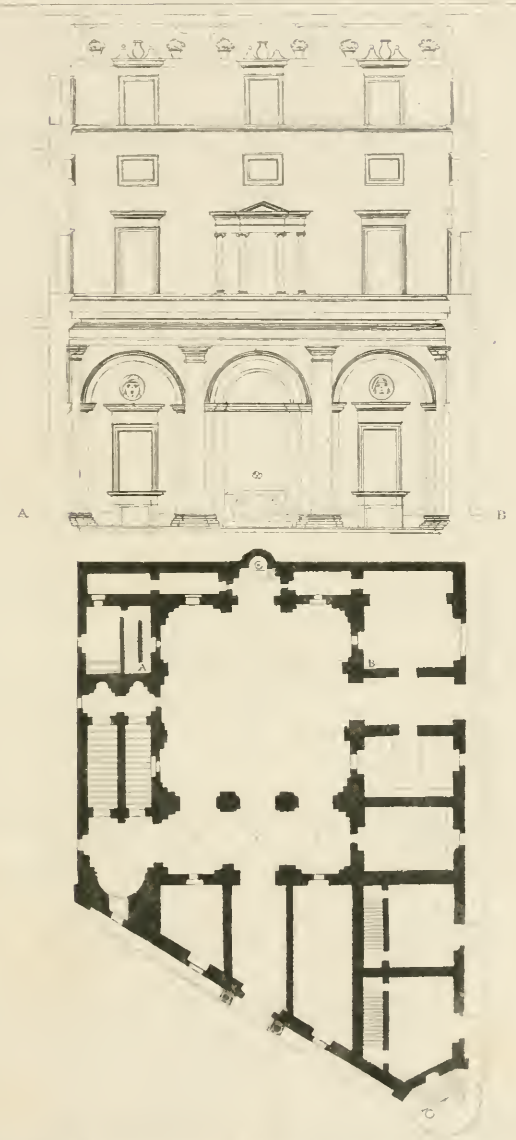

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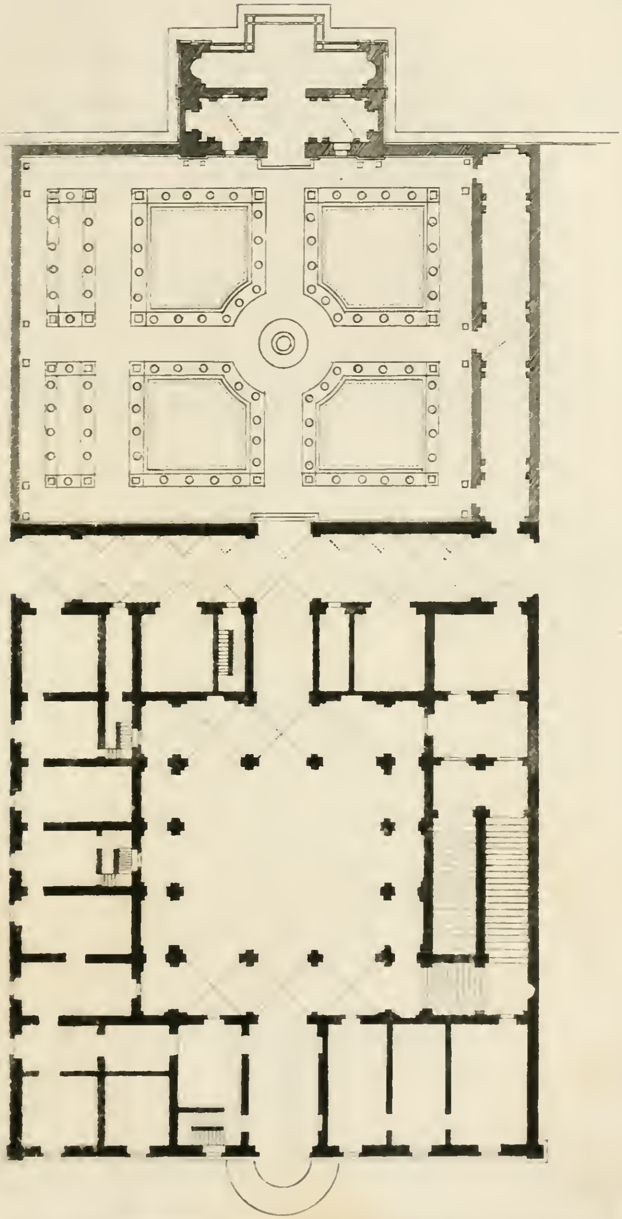

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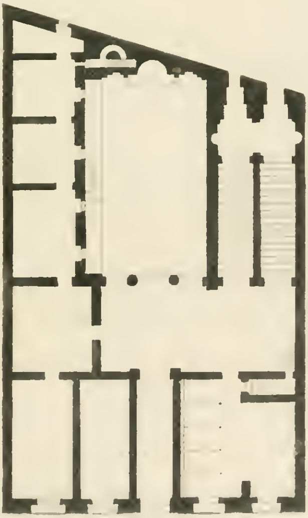

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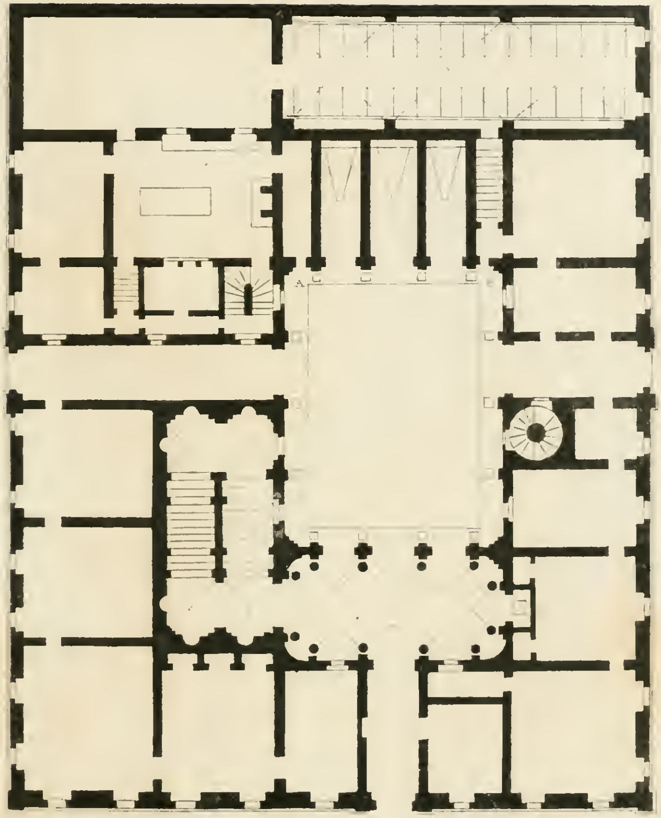

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ELEVATION OF A PALACE.

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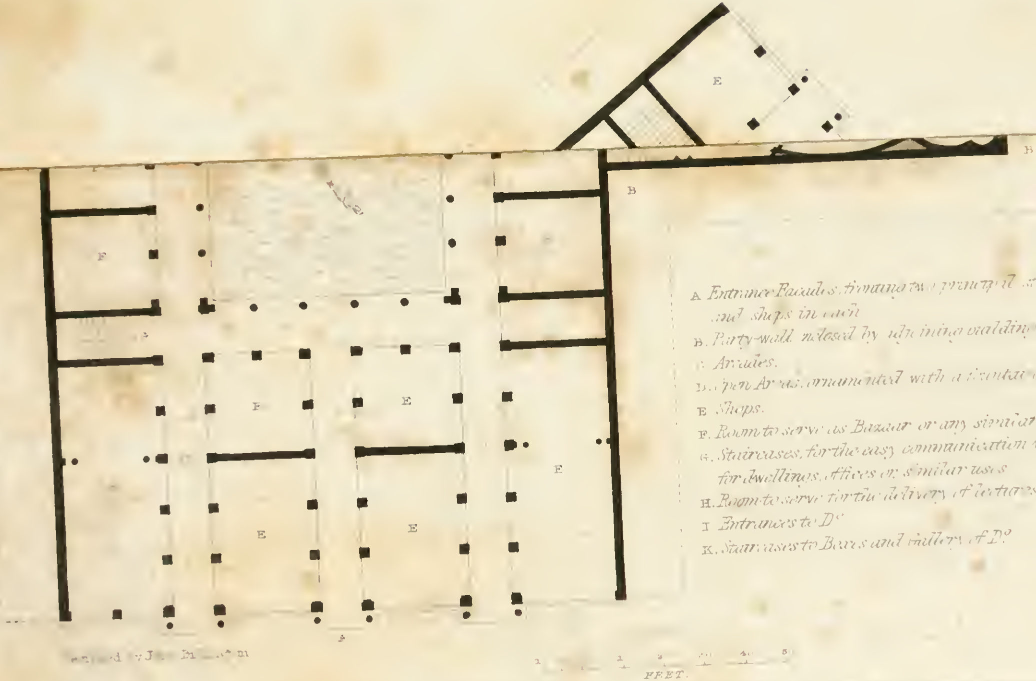
PLAN OF AN ARCADE,

ADAPTED TO AN IRREGULAR SITE



A Entrance Facades fronting two principal streets, having three entrances and shops in each
B. Party-wall inclosed by adjoining buildings
C. Arcades.
D. Open Areas ornamented with a fountain and statue
E Shops.
F. Room to serve as Bazaar or any similar purpose
G. Staircases, for the easy communication with the upper stories intended for dwellings, offices or similar uses
H. Room to serve for the delivery of lectures [illegible]
I Entrances to D°
K. Staircases to Boxes and Galleries of D°

[illegible] by J. [illegible]

[illegible] H. Brooks

[illegible] Architectural [illegible]

PLAN OF AN ARCADE,

ADAPTED TO AN IRREGULAR SITE.

A Entrance [illegible] to Arcade [illegible] entrance and [illegible] each

B Party-walls [illegible] done.

C Arcades

D Open Area ornamented with [illegible]

E Shops

F Room to serve as Bazaar or any [illegible]

G Staircases for the access [illegible] for Dwellings, Offices or similar [illegible]

H. Room to serve for the delivery of [illegible]

I Entrances to H

K. Staircases to Boxes and Gallery of H

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ELEVATION

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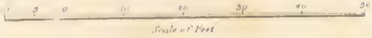
SERVING AS ENTRANCE TO AN ARCADE.



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Designed by J. Billington

W. Symns Sc.

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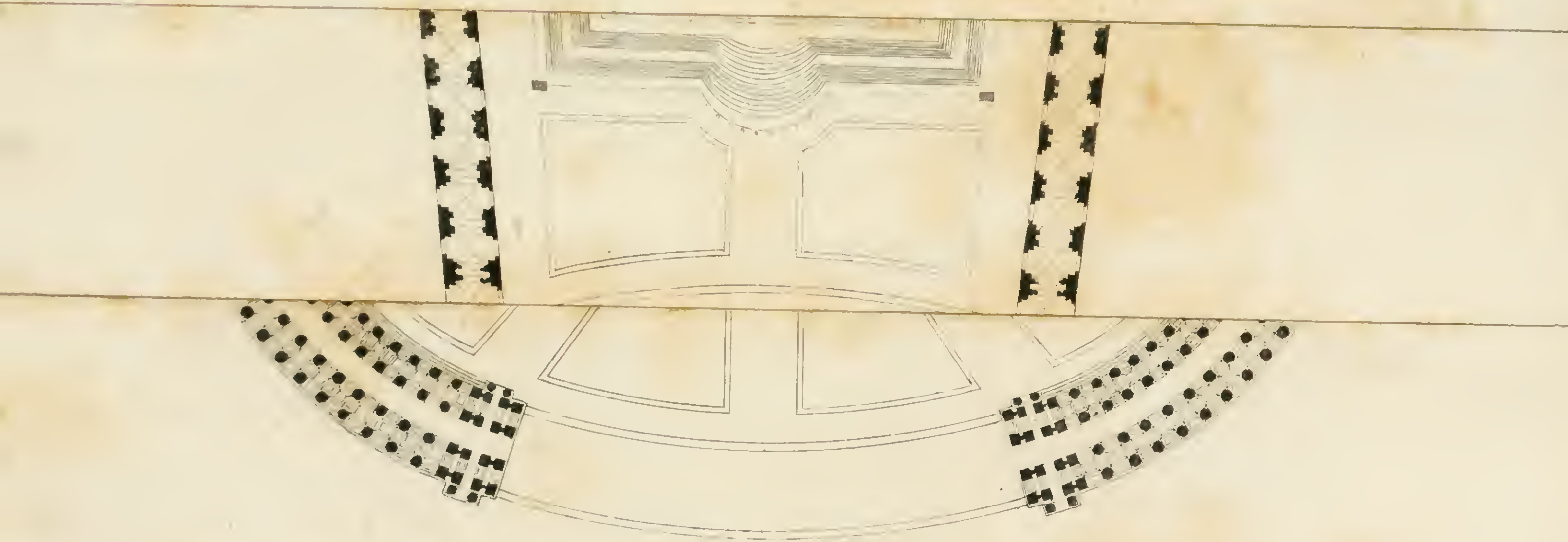

PLAN OF ST PETERS CHURCH AT ROME

Scale of the Plan

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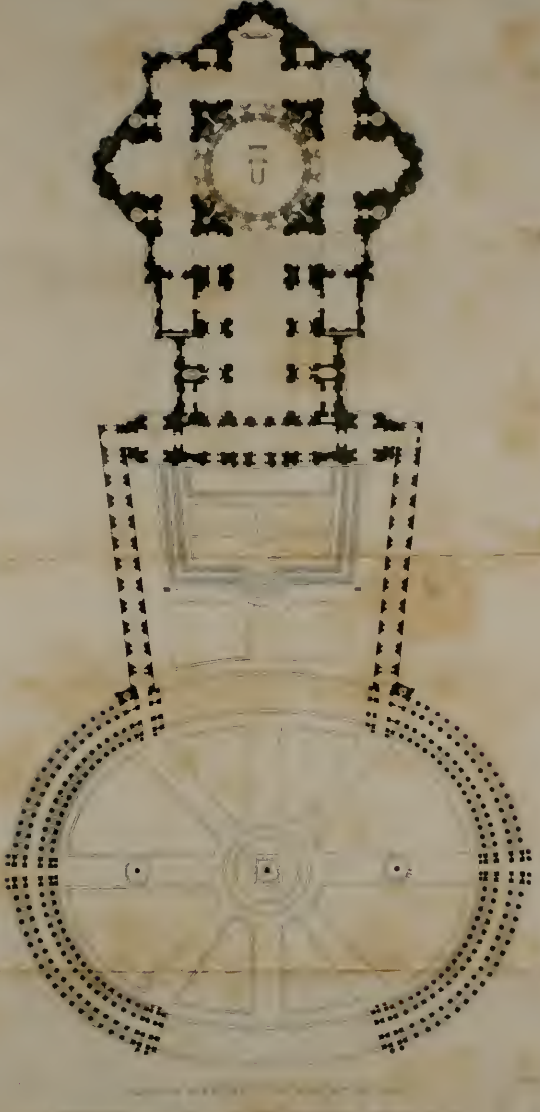

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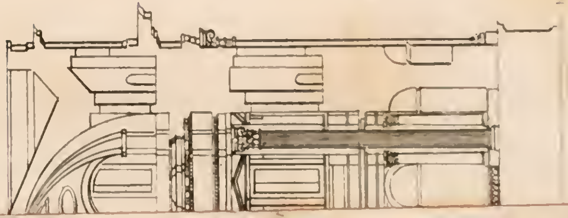
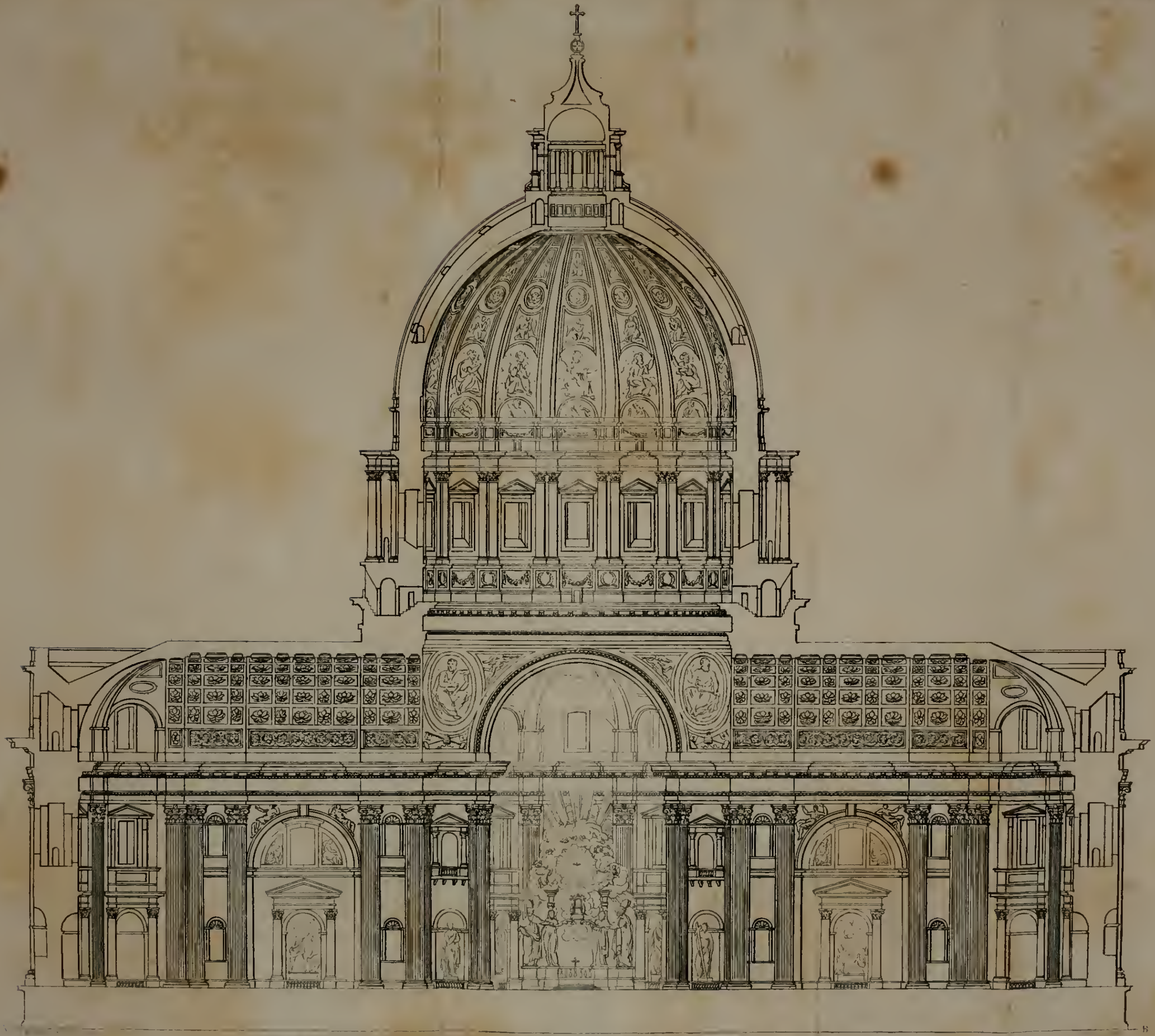
TRANSVERSE SECTION

OF A CHURCH.





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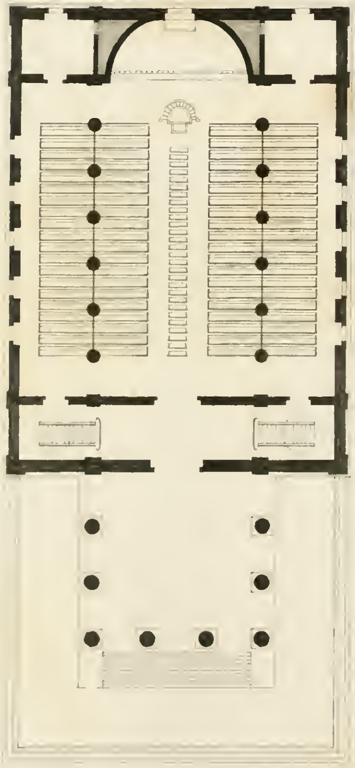
PLAN OF A CHURCH.



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Engraved by H. Brooke.

[illegible] Jn Bennett Three Tun Passage Paternoster Row

RESTORATION OF A TEMPLE

discovered, even in the utensils and furniture, which have been formed to supply our wants, except where their form has been changed by caprice.

There is necessarily then, a rule of taste dictated by nature, which prescribes to each kind of edifice, the character that it ought to present, in correspondence to the use for which it is intended.

There is another law of nature, that architecture has followed; which is, that beauty should be consistent with utility. Hence, if nature has joined a pleasure to the satisfying of every want, architecture has equally established a law, that the details of construction in serving their office, shall at the same time present a pleasing object to the spectator. Thus this art requires that all ornaments, by being applied on the principle of utility, shall indicate their purpose; in order that its productions may satisfy our imagination and judgment.

Without entering into all the causes of character; whether in nature, in painting or sculpture, or in the architecture of different countries; it is intended to confine the present article to edifices constructed according to the principles of the antique architecture; which is intended to be examined theoretically and practically.

The best modern productions exhibit merit, only in proportion to their judicious imitation of the antique. The most celebrated men have not failed to render a just acknowledgment to the great masters of antiquity, for the success which they have obtained, in following the spirit of their invaluable models. Far from envying them of their desert, let us rather acknowledge the eminence at which these talented men

have arrived, and imitate the immortal lessons they have left us.

It is solely from the study of the antique, that the eminent architects of Italy, gained that judgment and taste, which presents itself in the productions erected in that country, during the fifteenth and sixteenth centuries. It is from this study, that Vignola, Serlio, Scamozzi, and Palladio, owe the style and character which pervade the generality of their works. It is again, from it that Michel Angelo acquired his knowledge of construction; and attained that greatness of manner which his works exhibit, notwithstanding the many licences that disfigure them. In fine, it was from this study, that Alberti, Ligorio, Bruneleschi, Bramante, Sangallo, Peruzzi, and other celebrated artists and connoisseurs, gained their knowledge of architecture.

But this study of antique remains, requires a greater degree of critical discernment than is generally admitted. What may be recommended on this subject, can be reduced to two principal observations. The first relates to the choice of objects proposed for imitation. The second, to the spirit which ought to direct this imitation.

These remains require, in their choice, a distinction of two kinds; the one relates to the period from which they take their date, and the other, to the people by and amongst whom they were erected.

Like empires, the arts and sciences have their revolutions; cultivated in one age and nation, neglected and forgotten in another; their improvement was necessarily the result of the labours and exertions of many generations.

We are, generally speaking, ignorant of the origin of an art or science, because the earliest essays are effaced by those more perfect attempts which immediately follow.

In the arts and sciences nothing is produced suddenly, or without a preparatory step; and all discoveries are made in such a gradual manner, that they appear almost imperceptible. Nevertheless, there are periods at which observations accumulate, and the necessity of improvement being more generally felt, induces those, gifted with a more perfect organization and placed under more favourable circumstances, to discover more powerful means of giving a new and better direction to preconceived ideas, and forms a remarkable feature in their advancement towards perfection. These distant intervals of time, are termed epochs; and the preference given to any one, is determined by the merit of its productions. The epoch of Grecian art, designated by the term antique, is generally extended from the century of Alexander the Great, to the reign of the Emperor Phocias, or near the sixth century of the Christian era; but which, perhaps, may with more justice be supposed to have terminated with the fourth century. It is reasonable to suppose, that during so many centuries, the causes which contribute to the perfection of the arts, could not have been equally favourable. Hence, it is necessary to become acquainted, through the medium of their remains, with those ages that were the most propitious; without which knowledge, we should be equally liable indiscriminately to adopt the early essays of the art, and also to be misled by the abuses that characterized its decline.

In order to be possessed of this necessary discernment, it is requisite to be acquainted with the principles upon which the art is founded; which are of three kinds. The first is founded upon the nature of things, or necessity; and is required for the satisfaction of the most uncultivated minds, and consists in the solidity of its parts; such is the perpendicularity of columns, the parallelism of stories, and natural symmetry.

The second is, the principles of beauty and suitableness. These are derived from experience and comparative excellence.

The third is termed, principles of taste. They more immediately relate to that portion of the art, connected with ornament and decorative details. These principles will be found sufficiently treated on, under their respective articles. They are mentioned in this place, to shew that not only a knowledge of these principles is necessary, but likewise that they should be adhered to, in the study of imitation of the antique. Two powerful motives ought to influence this observance. The first is, the slowness with which the human mind attains a correct knowledge of what is really beautiful. The attempts made to arrive at this point, often produce no other effect than a further removal from it, when not in possession of a rule whereby to direct our researches; and the principles just named are this rule. The second motive is, the abuse which may be made in the application of the most fortunate discoveries. Experience proves that man, from the time he has attained the highest and most extended degree of intelligence, being unable to improve further the productions which are the result of his

discoveries, commences innovations, and abandons those principles that constituted the perfection of his former works. From this cause proceed those arbitrary rules, which mislead many individuals; and who from a deficiency of proper information, make an indiscriminate choice, as shall be immediately shewn. But independently of falling into these errors, which are almost inevitable, the student is compelled to follow a slow and monotonous imitation, the result of which is always uncertain. The truth of this observation is much more important as regards architecture, because the imitation which this art makes of nature, is less direct than in painting and sculpture. Hence it is necessary to be possessed of fixed principles, which produce that degree of excellence, of which this art is capable. Nothing can be more valuable than such examples amongst the antique remains; in which genius has transmitted the immutable rules of beauty. Nothing is more reasonable, than the preference which has been given to these productions; founded on the suffrage of so many generations and so many countries.

It doubtless required the concurrence of the most favourable circumstances, in order that the same form that was determined by necessity, should be likewise that which was the most capable of exhibiting pleasing proportions. If we consider antique architecture, as regards its beauty, we shall be inclined to conclude, that the sole object in its formation was to convey pleasure to the sight, and that it had never been subjected to the laws of necessity. If it be examined as respects utility, no other architecture presents in so clear a manner, the stamp of necessity; which in the

Grecian, is satisfactorily proved never to have been sacrificed to appearance.

Thus it must be admitted, that this fortunate union of necessity and ornament, is one of the most valuable discoveries of the Greeks; and that this art is one of the most valuable results that man has deduced from nature.

It is from these antique remains, that the architectural taste adopted by this and other nations, has drawn its resources, since the restoration of the arts. The experience of modern times has too often proved the necessity of this imitation. Every artist up to the present century, who has lost sight of this imitation, has invariably incurred the reproach of his successors. The spirit of caprice may for a season applaud novelties, but the judgment of posterity never fails to hold him up to just contempt, who has contributed to prevent the progress of a correct taste

There are few abuses but may find countenance even in the antique, when it is imitated without discrimination. Hence the necessity of the strict employment of the principles of the art; without which exceptions would be changed into laws, and the abuses of rules would themselves become precedents for our observance. It is from the antique, that inventions the most opposite to its real spirit, are supposed to find justification.

It must therefore appear evident, that the antique remains require in the student a cultivated mind, to distinguish those objects most worthy imitation, and which, when suitably employed in the composition of edifices, will gain the admiration of the present age, and serve as models to posterity.

It has been stated, that the antique requires a distinction of two kinds; that the first relates to the time at which these structures were erected, the necessity of which has just been shewn; the second regards the artists by whom, and the country in which, they were erected, which remain to be proved.

There exist fragments of a considerable number of edifices in Greece, which take their date from a period considerably anterior to that distinguished by the perfection which the art afterwards attained: amongst others, are the ruins which mark the decline of the art in Italy, as also that of the Roman empire; such as the thermæ of Dioclesian at Rome; also the remains at Spalatro in Dalmatia, and Palmyra and Baalbec in Cœlosyria. These, nevertheless, present parts, from which a well-instructed mind might derive profit; but without just discrimination, a risk is incurred, of falling into the grossest errors. The following enumeration will afford a proof of what is here advanced, by shewing the liberties and abuses that have been introduced from an indiscriminate imitation. Thus the width of the intercolumniations at Spalatro, has given rise to the distancing of columns in the most faulty manner. Friezes prepared to the hand of the sculptor, but left without receiving his embellishing aid, gave rise to the introduction of a curved frieze, as an architectural form. At the decline of the arts and of Rome, from the scarcity of marble and the insufficiency of materials necessary for the construction of architraves, arches were raised from column to column. This custom has been continued, notwithstanding the contrary examples exhibited in the productions of the previous centuries. A few coupled columns amongst

the remains of Palmyra, have been sufficient authority for this abuse in their employment. Two mutilated pediments at Baalbec have been imitated, though they are in contradiction to the system of carpentry, and the laws that tradition have transmitted to us, in the edifices of Greece and Italy.

In conclusion, it may be observed, that it is to the edifices erected in Greece during the advanced state of this art, and to those at Rome in the reigns of Augustus, Trajan, and Adrian, the greater portion of which were conducted and executed by Grecian artists, that the attention should be directed in the choice of models for imitation.

It has already been remarked, that the antique requires observations of two kinds. The first relates to the choice of the remains proposed for imitation, the remarks upon which have just been concluded ; and the second to the spirit that ought to direct this imitation, which shall be forthwith treated upon.

The antique may be imitated in two ways; one in imitating its style, and the other in embracing the principles and genius which it exhibits.

It has been elsewhere asserted, that the imitation of these remains is indispensable to the artist ; as we do not enjoy a union of the same causes which promoted the perfection of this art amongst the ancients. These remains have become the focus in which are concentrated the scattered and fugitive beauties of nature. The gift of making a free imitation, is possessed by only a few individuals : and it is almost inseparable from invention. Indeed, those only who have given the most incontestable proofs of the latter, possess the former qualification. Thus a servile imitation, far

from leading to excellence, soon diverts us even from the path which conducts to it. A blind routine takes possession of the mind, and destroys the germ of invention.

It is difficult to conceive a more servile imitation, or a more injudicious application of the antique, than in the frequent and almost exclusive employment of the early Grecian doric, in most modern edifices. Such of our structures, the real character of which consists in an expression of lightness and elegance, almost invariably exhibit a servile imitation of the heaviest style of Grecian art, which would induce an observer to conclude, that their authors were totally ignorant of an appropriate style.

The imitation of the antique should not be servile, but free; that is, we should use its essence and appropriate its means; and not repeat without motive its details and forms. For how can it be supposed possible, by the last-mentioned means, to raise the art to that excellence, which it attained in countries, whose successful cultivation of it has rendered them immortal, when the extreme difference is considered, which exists between our manners, customs, and laws, and those of the ancients. In order to be enabled to attain the same eminence, there must be a corresponding conception; but the servile imitator, heavily and blindly pursues his course, without having any praiseworthy object in view.

From the resources of this art and the inexhaustible variety of their application, why, in imitating the antique, should we restrict the whole merit of invention, so congenial to the feelings of an artist, and so necessary in stimulating his exertions, to the servile talent

of copying, without modification, a limited number of forms and combinations? It is granted, that the proportions exhibited in the best remains of the antique, are eminently calculated to captivate the mind; and further, that credit is due also to those who imitate them, in preference to those of any other system of architecture. But it is essential to remember, that amongst the ancients, these proportions constituted only a means; and that the real end of the art was to adapt their employment to the manners of the period, and to local circumstances. They thus produced an art, previously considered purely geometrical, whose means of communication were as rich and expressive as those of painting and sculpture. It was from a profound study of the different effects, characters, and expressions, that resulted from the application of these forms and proportions, that the ancients succeeded in raising architecture to a sublime art. In this it is highly commendable to imitate them; and from their example, to study the alterations that the progress of time, manners, and information, have produced amongst the moderns; drawing from the immediate and invariable resources of the art which have been transmitted to us by the ancients, those secret analogies that nature may have established between these resources and our wants. Whatever difference there may exist between our customs and theirs, they were, nevertheless, of the same human nature, and susceptible of the same sentiments and efforts.

The art of characterizing, that is to say, of rendering evident, by material forms, the intellectual qualities and moral ideas required to express in edifices, or to make known, by the harmony and suitableness of al

the constituent parts that enter into their composition, the use for which they are intended, is perhaps, of all the secrets of architecture, the most difficult to develope or to attain. This happy talent of conceiving and of communicating the conception, in the physiognomy suitable to each edifice; this sure and delicate discernment, which exhibits the distinguishing parts of such edifices, that at first appear susceptible of no characteristic distinctions; this judicious employment of the different styles, which are as the tones of architecture; this skilful application of the signs, which the art employs to affect the sight and understanding; this exquisite feeling, which errs neither in the just disposition of the masses and employment of the details, nor in the just dispensation of richness and simplicity; and which is able to combine true expression of character with the harmonious accord of all the qualities susceptible of being represented by architecture; all this requisite talent, which study perfects, but does not produce, is a gift possessed by few. This suitable expression presents itself under two relations; the one appertaining to architecture in general, and the other to edifices in particular. The first consists in the expression of the qualities or intellectual ideas, which are the result of the art metaphysically considered. The second, in the true indication of the uses for which edifices are designed; that is, in considering architecture as a certain mode of expressing or painting. This expression, according to the nature of the buildings and edifices, may be produced by the gradation of richness and greatness proportionate to their nature, and the object for which they were erected; by the indication of the moral qualities

attached to each edifice, the manner of expressing which, is beyond the reach of rules; by the general and particular forms of architecture; by the species of the construction and the quality of the materials that may be employed in their execution; and lastly, by the resources of decoration.

The first and most important rule in expressing the proper character of buildings and edifices is, doubtless, to know their nature and analogous qualities. If the character and use of any edifice be examined, they will be found to present a necessary relation to, and a decided analogy with, some of the qualities that architecture is enabled to express. From the simple hut of the husbandman, to the sumptuous palace of the sovereign; from the habitation of the citizen to the temples of the Divinity; from the least public establishment to the great monuments which form the embellishment of cities; there exists an extensive variety of grades, to each of which the art affords an appropriate character.

The want of this proper character in the different classes of edifices of which cities are composed, cannot always be attributed to the artists. Public manners have a very decided influence in causing this striking disproportion in, and confusion of, the scale of propriety in the appearance of edifices. When the acquirement of power and the possession of riches afford men the means of obtaining luxuries, the simplicity of the style adopted in the habitations of their fellow-citizens is rejected; they will no longer inhabit constructions which designate them as being mortals, but they raise for their dwellings, temples and other similar edifices. At Athens, the houses were simple, and the public

edifices sumptuous. Rome also retained, for a long period, this same moderation in the residences of individuals.

Architecture suffers great injury from these customs and mistaken ideas of luxury; which tend to destroy the arts, although they may be profitable to the artists. This art is injured by the influence of corrupt manners; by the apparent decrease of richness and greatness in public edifices, which is caused by the increase of these qualities in the residences of individuals. For how can it be expected that the characteristics of an edifice will be observed amongst a nation which does not observe even the most ordinary gradations in the order of the distinctions belonging to the different classes of buildings? Again: greatness, elevation, extent, richness and luxury of decoration, are the means by which edifices are characterized. If an injudicious melange of these means be applied to all kinds of constructions; if the residence of an individual presents in its peristyle the appearance of a church; if the magnificence of the richest of the orders be applied to buildings, the nature of which is in contradiction with their employment, is it not evident that the most material of the distinctive signs of edifices will disappear? What means could be employed to express that this edifice is a church; or that that is destined to some important public use; if the signs which are absolutely necessary for the expression of these qualities, be indiscriminately employed in all kinds of buildings?

There is no doubt, that the manners of a people influence the character of their architecture. Where there exists a great inequality of rank and fortune

amongst a people, it is strongly marked in their architecture. Where public edifices are neglected, this art only exhibits the luxury of individuals.

If we consider the antique cities, where the arts took up their abode, how modest and unassuming appeared the residences! But how immense were their public edifices; how their temples, tribunals, &c., majestically distinguished themselves from the adjacent habitations! It was in them that the public pride and enjoyment was placed, being considered as the property of each citizen; and the fame and pleasure attached to their magnificence, was not individual, but national.

The Greeks have left us the following proof of their ideas on this subject: "He who erects a residence that shall exceed in splendour and majesty the temples of the deities, or the edifices destined to public service, far from being worthy of esteem, merits but reproach. No private construction ought to insult, by an appearance of importance and magnificence, the public edifices."—*Laws of Charondas.*

The public edifices form a history of the taste of each generation. Every generation, like every individual, desires to leave marks which may serve to shew the epoch of their existence upon the earth; and also that they were rich, powerful, and favoured by nature in the possession of talent. The love of immortality, which is next to that of life, exists amongst all classes of men.

In fine, the public edifices represent the nation itself; inasmuch as they attest the degree of taste, wealth, and refinement, at which it had arrived.

It must not be imagined that to give the proper

character to public edifices, incurs a greater expense. Talent may supply expense. When funds are insufficient for the ordinary means, still it is possible to display a certain magnificence; for there is a magnificence which is unattended with expense, it is that of taste.

By these means, the energy of the character proper to each edifice, would acquire more value. Independently of their particular elevation and real dimension, they would gain upon the public opinion, by the striking contrast they would offer to the surrounding buildings; exhibiting at once to the eyes of the spectators, the real character and importance of each. If the peristyle with a pediment was exclusively dedicated to churches, what a majestic influence, and, as may be said, sanctity, would it not acquire, by the certain and determined idea that it would awaken in the mind of the spectator. If the employment of columns, judiciously arranged, were reserved for the decoration of public edifices; how imposing and significant would they not become! The resources of sculpture would be effective according to the greatness of the design to which they might be applied.

This gradation in the different edifices of towns and cities, is the first means of indicating their relative character. Thus an architect is not at liberty arbitrarily to dispose, and indistinctly use, all the resources of his art, in the edifices which he erects. So that in the composition of any design, he should bear in mind, that each edifice must possess relative qualities, which architecture is enabled to express and manifest to the sight. Each of these qualities will accordingly serve

him as a type in his invention. By displaying an ignorance of them, he will draw upon himself the just criticisms of those who are versed in the art.

The residences of individuals may be varied by presenting appearances of simplicity, together with a certain elegance free from luxury; though still conforming to the general type which habitations ought to present. The palaces and mansions of sovereigns and nobles, are governed by the rank and quality of those who it is intended should occupy them. Palaces, and large mansions in general, ought not to exhibit other forms or style than are applied to private houses; the difference should only exist in their scale and proportions. The palaces of Florence and some other cities in Italy may be adduced as examples; they all present houses that are more lofty and spacious than ordinary, yet always exhibiting the same style as the other habitations. All the riches of architecture ought to be reserved for the public edifices. In them, likewise, an artist should exhibit all his talent and penetration, in proportioning and modifying his resources, according to the nature of the edifices; indicating in them their analogy with the moral qualities which they ought to represent.

It is very important that the language of architecture have its value, so that its signs be understood and produce those effects of which they are capable. Therefore it follows, that to express a particular quality by means of certain objects, it is necessary that the same means be not indiscriminately employed for the expression of any other quality. An architect ought then, in order to characterize his productions, to apply all his diligence and study to the perfect

attainment of the expression of the respective qualities in edifices.

The analogy of some edifices with the qualities which they ought to present, are of so decided a nature, as not to be easily mistaken. Thus it is evident that a prison ought to inspire terror, and an assembly and concert room, pleasure. If the impression of the ideas which should be conveyed by such edifices, fail in their effect; it is not from the individual's ignorance of the evident qualities that these ought to express, neither that they do not offer sufficient scope for the exercise of his talents, nor that he is wanting in suitable resources from the art; but is caused by the absence of that requisite qualification, ability. To form an exact and distinct idea of the special and proper qualities of the different numerous edifices, in which the similarity of their uses seems to strengthen their affinity, requires considerable talent to accomplish.

Often false ideas, even in the judgment that ought to conduct the student in the choice of character, cause him to err; from a conviction that all the richness of his art ought to be applied to edifices which, in reality, require but a very inferior and subordinate portion. The evident gradation of richness or simplicity in architecture, is one of the most striking means that can be employed to characterize objects; but this and other means are applied, or at least ought to be applied, to the metaphorical or ideal expression of edifices. It is this progression of opinion relative to the employment of edifices, as respects their uses, and the ideas attached to them, by which a student should be guided in the distribution of the resources of the art.

Churches present themselves as the first objects of

consideration. In them the artist ought to express all the sentiments of greatness, power, and majesty, attached to the Being to whose honour they are erected.

Now, richness in architecture is one of the signs representative of power. Richness, and the greatest richness, is then applicable to churches. By richness is not understood a confused mass of decoration, composed of marbles and metals; the vain display of which, only serves to convey an idea of luxury and superfluity; and for this reason it tends to impoverish the sentiment which is wished to be expressed. Richness consists in the multiplied employment of the columns of those orders that present the greatest number of ornaments, and the greatest magnificence. The Greeks assimilated the several orders to the different characters of their divinities. They possessed the art of exhibiting this expression of the different qualities susceptible of being represented by architecture. Strength, greatness, and majesty struck the astonished spectator in the temples of Jupiter. Nobleness and gravity, in those of Hercules, Mars, and of Minerva. Pleasure, gaiety, and grace, presented their fascinating smiles at the temples of Venus, Flora, and the Naiades By a judicious employment of the different styles, they succeeded in exhibiting a precise expression in their productions, even when the divinities to which they were dedicated, offered a mixed character; and therefore requiring very minute and particular shades to make the indication apparent. Such were the temples of Juno, Diana, Bacchus, and others of the same class. No people ever carried to such perfection the poetical language of architecture. But what other

people ever existed under circumstances so favourable to this development? As each divinity was itself but the emblem of some moral quality; the religious, in consecrating temples to them, imposed on architecture the task of expressing and making evident each of their qualities, which were to form a particular feature in the composition of each edifice. Thus an architect charged with the erection of a temple to a divinity, employed by study the whole powers of his mind in order to gain a just and accurate conception of the real character of this divinity; that is, the qualities that had been given by the imagination to these allegorical beings; and thus to employ such means as would enable him to fix, through the medium of architectural forms, these fugitive results of the mind.

Although we have not in this respect all the resources that result from polytheism, we may, notwithstanding, vary the aspect and ordonnance of churches, by applying to each, as motive for their styles, some one of the attributes of the divinity corresponding to the qualities which are within the bounds of the art.

If, then, columns produce the greatest degree of richness in architecture, the artist that is economical and discreet in the employment of his means, will readily conceive that all edifices, of whatever nature they may be, do not require the same degree of this species of richness, as sacred edifices; and lastly, that all objects which convey any idea of, or approach to, the form of a church, when applied to other purposes, presents a contradiction.

It doubtless requires considerable study to attain a knowledge of the propriety which should be observed

in each edifice ; to determine the style applicable to its uses ; and to establish the physiognomy which it ought to have, on the nature of the qualities attached to it. Thus an exchange, where merchants, bankers, brokers, &c., meet to negociate their affairs, ought to express the qualities of those branches related to it. Opulence without luxury, convenience and commodiousness without elegance, and gravity without majesty, should be the characteristics of such an edifice : presenting a spacious interior, surrounded by a piazza.

It would be erroneous to establish the expression of the proper qualities of an edifice, either upon undetermined ideas, or puerile relations between the appearance of the edifice and its uses : as for example ; to suppose that the place appropriated to the coinage of money, that in which it is circulated, or that which serves as a depôt, should announce by an exterior richness of architecture, the material and metallic riches which may be contained in it. Thus, then, to determine the proper expression of character in edifices, their nature and propriety should always be consulted. By their nature is understood the rank which they hold in the public opinion ; by propriety, the degree of suitableness that their employment requires.

If dedicated to the cultivation of the Sciences, the study of the Belles Lettres, and of the Arts ; a noble appearance, without too much gravity, agreeable without voluptuousness, and simple without austerity, at once make known its destination ; galleries, forming colonnades, surrounding the principal parts of the edifice, enlivening its avenues, and embellishing its interior areas. Amongst the number of those erected

for similar uses in cities, there are many grades to be observed. If it be a place for education, it requires a greater degree of modesty, temperance, and economy.

If an hospital destined as a receptacle for the indigent, or the curing of their diseases; the great extent of the plan, exterior simplicity, convenience in all the accessory parts, numerous apertures for the circulation of air, a large and solid style of construction, presenting great and uninterrupted surfaces, constitute the characteristic contrast between this and other edifices.

If a store-house, custom-house, or warehouse; all that enters into their composition requires a character more of massiveness than strength, and a style presenting more rusticity than severity. The employment of columns is altogether in contradiction with their character; no degree of ornament whatever ought to present itself in these productions. Their magnificence consists in massive proportions, elevated arches and strengthenings forming chains, or bonds of projecting stones.

If a theatre, museum, or concert-room, all the graces of architecture may be called into action. Pleasure, gaiety, and delicateness, may in turn decorate its walls; but ought rather to be produced by taste than luxury. The amenity and lightness of the muses, and the sentiment of harmony, of which these edifices are the abode, are sufficient to inspire the real artist with a knowledge of the style suitable to them. The type for tribunals, ought to present an expression of gravity, decorum, and austerity. Their noble and seriously imposing ordonnance, should produce a sentiment of respect and awe.

If a town-hall; it ought to represent the wealth

and extent of the town or city, and the commerce and opulence of its inhabitants; serving as their rendezvous, and the principal place for the settling of their affairs. This kind of edifice ought to partake of the forms applied to palaces, but surpassing them in greatness, elevation, richness, and decoration.

There are many other edifices, the particular physiognomy of which might be given, were it not for increasing the length of this article which is already of considerable extent. These details may be easily supplied by a careful examination of the nature of edifices, and of the most proper means to render it apparent. By following this rule, neither the resources of architecture will be found too limited, nor its signs too few in number; but will afford all the variety of expression which the different compositions require.

Architects, doubtless, stand in need of being supported in their attempts to express the delicate sentiment of propriety of character in their designs, by the enlightened taste of the public; by the intimate intelligence between their manner of expressing, and that of comprehending, on the part of those to whom the signs are addressed. Notwithstanding which, architects have greatly contributed to corrupt and mislead the understanding of the public, by the abusive application of the means necessary to characterize edifices; and above all by the confused employment of the general and particular forms of architecture.

To characterize edifices, it does not suffice to have observed the necessary gradation of richness which propriety demands; nor to conceive the qualities analogous to the nature and suitableness of each. But when a student has determined in his mind the just

proportion of these grades; when his imagination has attained an exact idea of the scale and style proper for each edifice; it is then requisite that he be acquainted with the active and material means, whereby he may be enabled to fix his thought and give it consistence.

There exists between the nature of the greater part of edifices and many of the general and particular forms of architecture, a relation of conformity, with which it is extremely important to be acquainted; so as to prevent their employment in a contradictory sense; and also to derive an advantage by their judicious application. It does not suffice that this distinctive character should alone be indicated by the resources of decoration; though this aid, when judiciously employed, may, it is true, add to its perfection. But it is likewise required that the disposition of the total of a composition be judicious; that the forms employed be appropriate; and the whole harmonious; in order to produce the suitable expression of character necessary for each particular class of edifices.

It is upon the composition of the plan that depends the merit that ought to be apparent in an edifice; and firstly, that desirable quality, conveniency. It should be disposed so as to satisfy the wants and degrees of suitableness that the uses for which it may be intended require. In this respect, a talented artist is one that succeeds in uniting conveniency for the service of the interior, and the necessary dependances; so as to present a regularity is always desirable. Nevertheless, there is a pleasure produced by symmetry, in the uniform correspondence of all the parts of a plan; to effect which, it would be injudicious to sacrifice the

conveniency and propriety of its distribution. This exact observance of a symmetrical distribution, which is so agreeable to the sight, is seldom so connected as to present itself in the elevation. Inasmuch as this exactness ought to be observed, when unopposed by any reasonable motive; so likewise it should be renounced when it is found to interfere with that first obligation in all compositions, its relation to the wants and employment of the edifice.

In the composition of a plan, there exists a merit of another kind; which more particularly depends on taste. It is the general motive adopted, which determines the form of the edifice, its character, and what may be termed its particular physiognomy.

This merit depends chiefly on the form that the artist may employ for his plan. An edifice of a circular form will convey a totally different idea to one that is quadrangular. It may be remarked further to depend on what may be principally required that the plan should present; on the number of columns employed, and the solidity of the masses, to characterize an edifice; by making known that such dispositions are in relation with such and such uses.

In the plan of an edifice that is well conceived, as it determines the elevation, there must result from the vertical masses which arise from it, an agreeable aspect; by the mutual relation alone which the mind may perceive in it.

It may be generally observed, that upon the simplicity of a plan depends that of the elevation; and that this quality is the principle of greatness. A capricious and irregular plan, produces a multiplicity of projections, vicious forms, and interrupted lines;

and destroys, from the number of details it introduces, the effect of the architecture. In fact, the great effect in the antique temples, proceeds from the simplicity of their plans. Indeed, there is no edifice, the use of which does not determine the general and particular forms that should concur in its formation. Churches, for example, are considered the terrestrial abodes of the Divinity; but they ought not to resemble in any respect human habitations. Their plan should be simple, and uniform. The ancients never employed other forms for this purpose, than those which were either round or square. Thus, as regards our customs, the parallelogram appears the best adapted. Nothing is more in contradiction with the interior arrangement of churches, than the form of a cross: whatever may have been the religious opinion, on which its application has been so injudiciously established. This form interrupts their unity; introduces a union of, as it were, two edifices; and is in opposition to that necessary law of suitableness, which requires that the minister may be seen from all parts of their interior. It follows, that from these precepts of propriety, and the idea attached to the Being to whose service they are erected, that the less their details resemble those applied to our habitations, the more they will contribute to the expression of their true character. Also, the less the apertures for the admission of light, &c., be multiplied the greater will be their contrast with ordinary buildings. Or, if the manner of service require a considerable degree of light in the interior, the windows should differ as much as possible in form, distribution, and appearance, from those of houses; which serve at the same time for the intro-

duction of light, and to open to the inhabitants the agreeableness of the prospect which their situation may afford. All the other objects which enter into their composition, and which likewise form a part in the ordinary wants of life, should be dignified as much as possible in their application to these edifices. The ancients were strict observers of these principles of propriety; inasmuch as the general, as also some particular forms, were exclusively reserved for the temples of their deities. The essential difference that exists between the religious service of the ancients and that of Christianity, necessarily gave rise to the adoption of those peculiar distributions, remarkable in the temples of the former, and the churches of the latter. Thus the principal service of the ancients was performed in the enclosed area at the front of their temples; the temple itself forming but a species of sanctuary. Whilst the religious service of the Christians, required spacious interiors, capable of containing those who assembled to assist at the devotions; likewise that the officiating minister might be visible to all present; and also that each individual might possess the advantage of distinctly hearing those public discourses, which formed a part of the service. Amongst all the edifices employed at that time for different uses, none seemed to present a total so capable of satisfying all the exigences of the then newly established religion, as the basilica.

Hence, the principal reason for the adoption of the form of the basilicas in the erection of the churches of the early Christians, in preference to that of the temples, was, independently of their aversion to the worship of the ancients, their want of interior capacity.

Some writers have remarked, that the early Christian emperors caused the antique basilicas to be employed for the celebration of the new worship, which is evidently incorrect; for if this had been the case, some of these edifices must necessarily, from being applied to this service, have been preserved; however, far from there being any existing remains, it is even difficult to discover the sites which they occupied. The most ancient Christian basilicas, or those which date their erections from the first centuries of the public exercise of this religion, were constructed expressly for the uses to which they were applied. This statement is indubitably confirmed in the details of their architecture, which remain as undeniable proofs of the period at which they were executed. In the erection of these new edifices, the disposition of the antique basilicas was followed; and whether they retained their denomination, from the impossibility of changing a name, which custom had established for centuries, this appellation was given to those afterwards raised. The finest churches at Rome still retain this name, and take their date from the reign of Constantine. This disposition was afterwards imitated in the construction of Gothic churches; presenting a principal nave elevated above the side aisles, together with galleries, apsis, &c. The basilical form gradually disappeared in those churches erected after the revival of the arts; the principal reason for which proceeded from the desire that the moderns manifested, to unite the dimension of the western basilicas with the construction of the churches of the east; of which St. Sophia at Constantinople presents one of the earliest examples. The greater or less degree of expression

of this union, may be discovered from the era of the one just mentioned, to the erection of St. Peter's at Rome. The plan and construction of this famous church, has since become the model of a multiplicity of others, raised in different countries; which, notwithstanding the imposing appearance that they derive from their cupolas, the employment of which was to unite the four branches of the cross formed by their plan, has introduced into modern architecture a number of complicated forms and immensely expensive constructions, which are more opposite to a correct and judicious application of the principles of architecture, than is generally conceived. In their interior the heavy and monotonous effect produced by the piers of the arcades, destined to support the vaulted ceilings, the excessive expense of the different species of arches employed, and many other disadvantages which cannot be obviated without renouncing this complicated system of composition, and having recourse to more simple and elegant forms. At their exterior, the most conspicuous object is a rotunda or circular peripteral temple, situated upon one of a composed quadrangular form; producing the idea of an edifice altogether independent and entirely without relation to that which it surmounts. Is it not more desirable that these circular temples, surrounded by peristyles, indicating their conveniency for perambulation, had terra firma for their base, like those of ancient Rome, rather than to be raised in the air? The basilical form produces the most effective and appropriate plan, for the uses to which our churches are applied. It presents that admirable unity which satisfies the mind, and that pleasing variety which

gratifies and refreshes the sight, affording to the spectator innumerable diversified effects, produced by the same causes, almost without changing his situation. In fine, this disposition offers that desirable harmony contained in no other form; presenting the requisite dimensions for religious service; that richness of effect, combined with a grave simplicity, suitable to sacred edifices; conveniency in the accessory parts, economy of construction, and solidity added to lightness.

The soffits of the ceilings may be divided into compartments, as it contributes to enrich the ordonnance, which should progressiveiy increase from the foot to the summit. It is essential that the entablature be not interrupted by projections, the angles produced by which fatigue the sight, and destroy the degree of noble simplicity that should preside in these compositions. It is likewise in general preferable, that the greater volume of light be admitted from the upper part of the edifice. Lastly, churches composed after this manner, would unite that beauty in their interior, and that expression of nobleness at their exterior, of which the antique basilicas and temples afford us such invaluable models; exhibiting such a system of unity between the exterior elevation and the construction of the interior, as to produce in each edifice a harmonious total.

Although, as before remarked, the disposition of the above-mentioned examples cannot be applied to modern churches, without considerable modification, it is, however, of the greatest importance to possess a knowledge of their nature and proportions. From not having sufficiently studied these models, the architects

of many of our churches, have committed the most glaring errors. It is in these only, that examples can be found, presenting an expression of dignity and greatness suitable to sacred edifices.

From this knowledge would result the most useful guide for the progress of the ordonnance of those that may hereafter be constructed. And it may further be remarked, that the ideas acquired from these edifices, would greatly conduce to the perfection of others of every description, with which the individual might be intrusted.

The principle of applying to the façades of churches several orders of columns, situated above each other, is generally to be condemned; as, independently of every other consideration, the exterior of all edifices should be composed of greater parts, or larger divisions, than the interior; which gradation should not only exist in the proportion, but likewise in the degree of richness intended to be expressed. Hence the module employed in the ordonnance of the interior, should be less than that of the exterior. The student who is aware of the resources that the antique examples afford him, will not fail, in the construction of these edifices, to benefit from their system. His compositions will present the principal mass situated upon a slightly elevated basement, the ascent to which is gained by a spacious flight of steps. Upon this imposing base he distributes the façade; never forgetting the great object to which they are to be consecrated, and at the same time having the expression of the ordonnance in unison with the character of those to whom they may be dedicated. In fine, our churches should present majesty and solem-

nity; their aspect should attract, affect, and raise the mind of the spectator, to a contemplative admiration.

There are certain forms employed to represent and express the nature of monuments; which are in such a manner appropriated to them, by the nature of the objects, custom, and opinion, that their misapplication would be discerned by all. Such is, amongst others, the form of pyramids, relative to tombs and sepulchral monuments.

Arches or triumphal monuments have also, from the customs which have given rise to them, their characteristic forms.

The forms of some edifices are imperiously prescribed and determined; and the observance ought to be strictly adhered to; yet, as if this palpable idea of suitableness was a secret of the art, or a refinement, the acquisition of which was extremely difficult, many of the moderns have not even suspected its necessity.

It is their interior form which should determine that of their exterior; and inform the passing spectator of the uses for which they are employed. Is it not a strange caprice, to establish such a contradiction between their interior and exterior, as to require the aid of an inscription to determine their use. When the form is governed by necessity, it becomes the essential motive and type of all edifices of the same description. The ancients doubtless varied the dimensions, proportions, decorations, and accessories of each of the same species of edifices they erected; but there can be no example cited, where they departed from the general and elementary form, that constitutes the distinguishing characteristic of each class of edifices.

According to these same principles, circular forms

are not suitable for houses; as the necessity, type and progress of invention, does not require that a house should be so disposed. This kind of plan, when applied to habitations, produces a sensation of inappropriateness; and if the cause be sought, it will be found to be produced by the real and apparent difficulties which their interior distribution offers. There are besides semi-circular, or segmental walls, or porticoes, employed at the entrances of houses and edifices; which, by their form, belong to the same class. Nothing can be more injudicious than the application of convex forms for entrances; as, from their appearance, they rather serve to repulse the spectator, than to invite him to enter. It cannot be said that these observations are punctilious, or that these principles of suitableness are imaginary; although absolute necessity is not affected, and does not suffer from many supposed improprieties. This argument might be used, if the application of architecture was confined to benefit material beings alone, who possessed neither intellectual knowledge nor any sentiment of propriety; as it would not then be required that any efforts of judgment be employed to improve the mind by making it form a part in their necessities. A door is but an aperture placed in a certain situation for the admission of particular forms; then, provided that its dimensions suffice for the introduction of that which is to be admitted, necessity is satisfied, and requires nothing more. Yet it is doubtful whether any architect would deliberately employ apertures to serve as doors, the form of which should present a perfect circle. For as long as the human form is not changed, there can be no reason for changing that of our doors.

The ancients observed two points that have rendered their combinations more excellent than those of their successors. They adopted a positive model, which prevented any fantastical wanderings of the imagination; and secondly, the details necessary for the embellishments of this model, were also derived from the same source. Thence it resulted, that in their productions, like those of nature, pleasure was not only united to necessity, but was produced by it. From this also arose a species of pleasure which can be found in the original productions of no other nations; which is, that the principal objects which serve as its embellishments, were, in their origin, the forms of the construction itself; and thus there are few of these details, of which taste is not enabled, in their employment, to render a satisfactory motive to the faculty of reason.

Thus a very important part of architecture, which is named modinature, proceeds from the system of analogy which constitutes the principle of imitation in this art. It is to preserve this analogy, that the student, in his compositions, should direct his attention. If once this origin be forgotten, if, from a want of observance of these principles, confusion or disorder be introduced, the architecture loses its value and signification; and that which should have addressed both the sight and understanding, now even fatigues the visual sense, by its useless and idle repetition. All that should have a motive and reason, no longer present either; and the mind ceases to find, in an art with which it thus no longer sympathizes, the pleasure that it ought to enjoy from it.

When the architect supposes himself uncontrolled

by analogy, all the characteristic forms are distorted, perverted, and rendered unnatural. Who, indeed, can discover amidst the scrolls, twisted forms, breaks and mutilations, exhibited in the pediments, entablatures, capitals, shafts, profiles, &c., of Boromini, any trace either of the characteristic forms of these constituent parts, or any attempt at a significant application of them, in the edifices erected by him.

This abuse proceeds from two causes. The first took its rise from the equivocal nature of some few objects of embellishments that are employed in architectural compositions. That as certain minute details have received their origin from the pleasure produced by variety in the embellishment of the different productions of this art, and offering a transposition of objects; the reason for their employment being either connected with too early a period, or being too metaphorical in itself to be determined by an exact and severe analysis; it has been concluded that all in this art, even its constituent parts, might be considered as a metaphor; and, as it would naturally follow, all objects employed as embellishments, were treated as being arbitrary in their application, from the mere circumstance of there being some amongst the minuter class for which no positive signification could be assigned. The cause appears to have originated in the false idea that some architects have attached to invention. To them, the antique architecture exhibits a deficiency of genius, from the exact observance in the employment of the same forms for similar purposes; and they judged that to be monotonous, which presented the desirable quality of regularity. Being unable to appreciate the delicate

shades with which all the modifications of character may be expressed, they preferred the most exaggerated means, which in reality produce but little effect, from the circumstance alone of aiming at producing too much.

It cannot be doubted, that by a scrupulous observance in the suitable employment of the constituent parts of this art, all the variety and beauty of expression may be exhibited that correct taste can require. Thus, without affecting the principles by which the form and application of these parts are governed, there can be produced, at will, an almost indefinite number of shades of expression, from the most simple to the most compound character that an edifice may be required to present.

There would be required, by following in detail all the particular forms of architecture, a long enumeration of precepts of this kind, founded upon the essential and proper degrees of suitableness of each object; columns, pedestals, niches, windows, entablatures, and even the smallest profiles that the sight can distinguish in the most extensive masses. All have more or less relation to that which is required, or with those principles of suitableness which are more or less imperative. It is from a knowledge and the observance of all these relations, and from their exact and reflected indication, that results in the detail as in the total, that which is called the proper character of edifices. But it is not in the present article, which is destined to a general theory, that more detailed applications should be entered into, as they have already been given in each of the articles treating on the constituent parts of edifices.

If the examples and general principles which have been developed are true, it is for the reader to draw from thence all the results which may be derived; and to complete this catalogue of all the inconsistencies that a total forgetfulness of the necessary principles of the art have, during a long period, accumulated in modern architecture. He will discover the reason of this want of character; which, like a secret disease, attaches itself to edifices, without either the cause or remedy being known. He will, above all, discover the reason of this great disparity of effect and impression, between the works of the ancients and those of the moderns.

An intelligent modification of the resources of construction, is another of the means that an architect possesses to particularize the style of his edifices, and to enable him to imprint on each the necessary degree of suitableness and propriety. By construction is understood, that part of architecture which more particularly relates to the different materials and the conducting of their employment, so as to aid in giving the true expression.

What different impressions the varied resources of construction are capable of producing! Noble and multiplied openings may display themselves to attract; and heavy masses of masonry that obstruct the view, will convey the opposite sensation. The lofty elevation of vaulted, and the calm effect of flat ceilings, or their surbasement, will each produce different effects upon the mind. The proximity and contrast of even and projecting parts; the marked expression of the carpentry or primitive type in an edifice, and the scientific combination of the masonry,

or the skilful distribution of all the material means employed; though they act in a less decided manner, nevertheless they affect both the understanding and taste. Construction has then its styles, and their grades cannot be classed amongst those which have the least hold upon the mind. On the contrary, they present a palpable relation to the nature of the object for which they are employed; and it is therefore very important not to neglect such resources.

In proportion to the difficulty there arises in working materials, owing to their hardness, the less their forms are exposed to the variations of caprice; and hence results in the same ratio an expression of greatness and strength in the edifices in which they are employed. Materials, in masonry, of a free quality, convey an equivocal and indefinite appearance; both by the impression that results from the fragility of the substance, and by the details exhibiting the little difficulty required in their formation; as they easily yield to the hand and chisel by which they are wrought.

Wood, likewise, according to the talent that directs its different combinations, and its employments, is also susceptible of producing a strong and imposing aspect.

The absence of this character of solidity, proceeds doubtless from the beauties of architecture being little appreciated or understood. Thence, that natural indifference towards this art; and from this indifference, the small number, and confined extent of the public edifices, and the little care manifested in their construction. Also that routine which has reduced simply to a trade the most fine and delicate com-

binations of the favourite art of the ancients; and changed into a mere mechanical process, the operations of genius.

All the economical means, the mechanical operations, mathematical demonstrations, and all the ingenious processes and discoveries adopted in this art, have only served to destroy that expression of simple, imposing, and visible solidity; and even when it is proved that real solidity loses nothing from these economical resources, it nevertheless always loses in appearance.

One of the most energetic means of giving to a construction, an expression of strength, is to work its masonry in rustics. By the employment of these means, which increase in the mind of the spectator the real dimensions of the materials, there may be given an appearance of greatness proportionate to the expression that it may be intended to exhibit. The projection of the masonry thus wrought, conveys an idea of duration and resistance; by which is depicted strength and power.

The smaller the apertures of an edifice are in dimensions and number, the greater will be its expression of solidity. Close intercolumniations, large parts left plain, extensive surfaces uninterrupted by details, wide piers between windows, considerable spaces in the division of stories, each of these contributes to this character of strength.

Hence the employment of materials ought not to be made without discernment. The general rule is, that their size should be proportioned to that of the edifices. However, they may be proportioned according to the expression of strength, delicacy,

majesty, gaiety, magnificence, or lightness which should constitute the character of the edifice. The quality, length, and dimensions of its materials, should form a part in the degree of suitableness requisite for the expression of the total. Large masses of stone of solid division, square and rustically wrought, would aid to designate prisons, and such works as are intended to resist the attacks of men, and also of time. But the sensation of indestructibility in edifices serves also to produce those of astonishment and admiration. There are examples, such as churches, where it conveys an idea of eternity. On such occasions it cannot be too evidently manifested. But in giving to the materials the largest dimensions possible, their surface ought not to present any appearance of resistance. Their joints, instead of being raised in bossages, should be imperceptible; so as not to present that multiplicity of parts which forebode their decomposition. The unity that ought to constitute the moral motive in the conception of the plan, should apparently exist in the materials of which it is formed. When all the joints of the masonry present themselves to the spectator; when he is able to count the number of the courses; it causes him to calculate before-hand the time necessary for its destruction. After a period of three thousand years, the joints in the masonry of the Egyptians, may be sought for in vain. No people has better conceived the manner of conveying an idea of eternity in their constructions: and it is necessary to imitate them, when we intend to erect aught to the Divinity.

The hardness of materials, besides affording a precision and finish of execution, further serves to convey

an idea of solidity; and is therefore particularly suitable for public edifices. In them the multiplied employment of timber is misplaced; it being better adapted to residences and minor constructions. But bricks, in such situations where these materials are common, present for private habitations a just degree of economy, solidity, and lightness. These materials are inferior, in public opinion, as also in reality, to stone; and can only be employed with success, for the effect of the character which they produce, in constructions of a mixed kind; as magazines or stores; serving as depôt and place of sale for various commodities and merchandise; aqueducts, and rural buildings.

The effect of materials is another resource from which the art may profit. By this is meant, the effect that is produced by the beauty, rarity, and colour of certain materials; as also from their mixture, manner of working, and the varying of their appearance.

The ancients understood better than we, in what the essential beauty of architecture consists. For their constructions, stripped as they are at the present day of all ornament, do not fail to move us to the highest degree; and to excite such impressions as modern edifices, although entire, are unable to produce.

The colour of materials has certainly a command over our senses; and for that reason has a natural connexion with the other means proper to characterize the productions of this art. Marble of an austere and monotonous tone, inspires gravity and reflection. That of a dark colour, or black, produces melancholy. Flowered or veined marbles, of a delicate hue, excite gay and lively sensations. The last of the resources

that are employed to characterize edifices is decoration.

The ornaments employed in the decoration of architecture, are, as regards their execution, a positive and direct imitation of nature; but their composition and employment are governed by the appropriate character of edifices. The Greeks, amongst whom they were first employed, possessed the art of submitting them to the laws of suitableness, if not of necessity; but at least of utility. Ornaments, among them, were a species of allegorical writing; the general characters of which always designated something relative to the edifice to which they were applied.

To the capricious taste exhibited in arabesques, may be attributed the introduction of those numerous irregularities which have so greatly prevented the progress of this art.

Ornaments ought to compose an assemblage of intelligible and expressive characters, capable of conveying the ideas of those by whom they may be employed. Placing aside, for a moment, all motive of utility in the application of ornaments, correct taste requires that they afford pleasure to the sight, and add to the general harmony of a composition; by the just, agreeable, and economical disposition of all the objects of which ornaments are composed.

The same taste likewise proscribes the introduction of the arabesque style in sculptural ornaments; which in exposing to the sight such extravagant combinations, would, from the absence of colours in sculptural ornaments, present a still greater degree of deformity.

In the proscribed class of ornaments, may be placed those of the school of Boromini; consisting of fantas-

tical foliage, grotesque heads, chartouches, shells, escutcheons, and many other puerilities, with which architecture has been so long burdened.

Among other means employed in the decorative part of architecture to strengthen the expression of an appropriate character, attributes hold a conspicuous rank. But if these attributes are admitted as constituting the letters, words, or phrases of a language; what is to be understood when we find the signs indicative of divine worship applied to edifices totally unconnected with such purposes? Or when their ordonnance is decorated with the symbols of festivity, without being employed for the celebration either of public fetes, or amusements, the spectator must necessarily be deceived. Hence by arbitrarily transposing the various attributes, and indiscriminately applying, in the decoration of capitals, friezes, pediments, &c, all the signs representative of the qualities, or properties of objects, the decoration of an edifice is supposed to be perfected. Such an application resembles the conduct of an individual, who, ignorant of the value of the characters employed in writing, amuses himself by idly tracing them, without questioning their signification.

It is by preserving these signs, and the relations which they bear to edifices, that the desirable end is attained of satisfying both the sight and understanding.

Attributes should be appropriated to the expression of the nature of such edifices as require their exclusive employment. The Greeks and Romans arranged and applied to their principal edifices, characteristic symbols and attributes. Means so simple and numerous ought not to be neglected; and ought to displace the

employment of inscriptions; above all in a nation instructed in and familiar with allegorical signs. What more pitiful resource than that of an inscription applied to an edifice; when without it, a spectator would be ignorant of the use to which it was dedicated! It would remind him of those old paintings executed in the middle ages, which present figures without either life or character, requiring for the interpretation of the subject, that legends and inscriptions be employed, as if proceeding from their lips.

Having proceded thus far with this theory, in which it has been the endeavour to exhibit the resources of the art necessary for expressing the character of private buildings and public edifices; a few remarks on the gardens that are sometimes required to accompany them, might not be misplaced.

It is the general aspect of a building or edifice that should determine the degree of magnificence or simplicity that a garden, attached to such architectural productions, ought to present. Hence it is on this distinction alone, that the general principles of this branch of art are founded.

Gardens, when considered relative to their particular destination, offer very distinct qualities. A symmetrical distribution is necessary for gardens attached to palaces and town residences. The regular and confined surface to be employed; the importance of the building, and the influence which it should naturally have over the limited space attached to it; all concur to shew the necessity of submitting gardens of this nature, to a symmetrical distribution. The same observation may apply to all gardens, public and private, situated in towns or cities.

The gardens attached to the palaces of sovereigns, require to be as extensive as possible, and ought to exhibit pomp and magnificence.

Public gardens ought to be regarded as essentially necessary to the inhabitants of large towns. Their site, when it is possible, should be an open situation; surrounded by pleasing and agreeable distances. Shade is one of the first requisites during almost all the hours of the day. The trees planted should be such as, from the size and foliage, are enabled to preserve the walks from the rays of a summer sun. The alleys should be numerous and commodious. Those forming a straight line are to be preferred in the present instance. The public, for whose relaxation such gardens are intended, require, in taking their promenades, both to see and be seen; as also to enjoy the society and conversation of their respective parties. To answer these purposes, therefore, spacious straight walks are more favourable than narrow and winding paths. Nevertheless, a public garden occupying a considerable extent of land, may, besides its avenues, contain a few picturesque walks distributed through its principal masses of verdure, foliage, and flowers; which in fact may be considered as necessary in order to produce a degree of variety in the total.

The gardens attached to colleges and other edifices dedicated to the cultivation of science and education, are susceptible of receiving a distinct and particular feature. They should present a pleasing and lively aspect. Recesses consecrated to Apollo and to the Muses, arranged in a characteristic manner, and decorated with the statues or busts of these divinities,

may be judiciously employed. Temples dedicated to the most useful sciences, might also be introduced with allegorical decorations; or monuments, bearing short inscriptions, which, when arranged with judgment, serve to convey instruction and useful advice. A few shady arbours of an agreeable and serene appearance, might invite the studious reader. In other parts, many free and open situations should present themselves, surrounded only by such light foliage and plantations, as do not prevent the circulation of the air or hide the points of sight.

The gardens belonging to religious establishments, are required to present an obscurity and an imposing silence from their secluded situation; so as to prepare the mind for and invite it to appropriate reflections. Clusters of dark evergreen shrubs, together with shady retreats formed in the thick foliage of trees, serve to convey a corresponding expression in their compositions.

Gardens connected with public baths, should not only offer commodious and varied walks, to induce the visitors to exercise themselves by a promenade in the open air, but also numerous places of assembly and amusement; together with seats distributed in various situations, forming a species of arbour, affording those who repose, a pleasant shade.

The gardens attached to hospitals may present dry gravel walks, occasionally bounded by low trees or shrubs, and have seats placed at convenient distances. Insulated groups are preferable in the present instance to alleys.

To render the plan laid down complete, it remains to treat on country residences.

The remains of the antique villas, that Italy possessed at the restoration of the arts, doubtless produced those inspirations, that gave rise to the excellent productions erected during the fifteenth and sixteenth centuries. The elegant erections, with their magnificent gardens, that arose during this period, afforded additional aliment for the genius of the arts.

The art of laying out and decorating gardens, which has so intimate a relation with architecture, at this time formed a part, as it apparently did amongst the ancients, in the qualifications of the architect.

The parks of the great, ornament and form a conspicuous feature in the extended landscape; whilst the gardens of private individuals embellish the suburbs of towns and cities. Many of the most celebrated cities of Europe, present such an enchanting scene, arising from the country residences with which they are surrounded, that the observer remains fixed with admiration. It is thus with the charming vale of Arno. The city of Florence occupies its centre, encircled on all sides by an amphitheatre of fertile hills, covered with country houses. Of all the cities which present the above advantages, together with the most beautiful detailed models, modern Rome stands pre-eminent.

The characteristic features of those of Florence, Frascati, the Villa Reale, at Pratolino, Villa d'Este, at Tivoli, and others situated in different parts of Italy, are magnificent conceptions, extended plans, ingenious ideas, the union of architectural productions with plantations; of foliage with statues; and the employment of water forming basins, cascades,

and fountains; which produce numerous pleasing effects, and have served as models for the greater part of Europe, during the last two centuries.

Many of these great and beautiful compositions of gardens still exist, as monuments of the correct taste of the period from whence they take their date. The most conspicuous are those of modern Rome, a few of which number, presenting majestics, simple, picturesque and mixed styles, shall be enumerated.

The gardens of the Villa Borghese are imposing at their entrance, and majestic in all the parts leading to the villa, consisting of spacious alleys. Abundant fountains, ornamented with allegorical groups, are the first objects that prepare the imagination for the reception of the master-pieces of art, and the beauties of nature, presented in and around this habitation. Groves of varied appearance are seen through the openings in the thick foliage forming the alleys; compartments of flowers surround the residence; and cascades, whose liquid and transparent masses animate the scene. Proceeding further, are piscines, furnished with different species of fish; and animals of various kinds gambol under the shade of a plantation or on an open lawn.

From this scene the sight and mind will find repose, by contemplating the beauties of the gardens of the Villa Ludovisi, situated upon the same Mount, Pincio. A pleasing melancholy is the effect produced by their simplicity. Long alleys, bordered with myrtle and cypress trees, presenting at their extremity fragments of antique tombs, and groups of figures shaded by thick foliage. On arriving at the most elevated point in these gardens, an imposing view of the sur-

rounding country presents itself; and on descending in another direction, clusters of fragrant shrubs refresh the senses.

On entering the Villa Albani, the visitor suddenly finds himself in a spacious and elegant vestibule; having its elevation, fronting the gardens, composed of arcades with columns, above which rises the rest of the façade. In face is an extensive area occupied by compartments of flowers, by statues, vases, and fountains of numerous jets; the whole of the perspective being terminated by an orangery of a semicircular form, above and at the sides of which rise evergreen shrubs and trees. On the one side are shady walks formed of flowering shrubs, in a part devoted to the cultivation of vegetables. On the left extends a lengthened terrace, offering a commodious promenade, and at the same time commands a most delightful prospect.

There are the Villas Negroni, Madama, Matei, and many others that are particularly deserving of notice; amongst which is the Villa Pia, and the gardens of the Villa Pamfili.

It might be well to offer a brief sketch of the architecture of the first of the two last mentioned: the Villa Pia, situated in the gardens of the Vatican; to shew the ability with which the architect has contrived, in a very confined space, to present all that can contribute to form a delightful habitation. In the centre of an amphitheatre of flowers, surrounded by masses of verdure, is an open pavilion decorated with delightful paintings and stuccoes, and is elevated on a basement that is washed by the water contained in a basin, placed against its base, for receiving the

jets of several fountains, around which statues, vases, and fragments of sculpture are arranged.

Two flights of steps lead to the principal building, sheltered by low walls, ornamented with niches and marble seats, and afford repose under the shade of trees with which they are surrounded. Two porticoes, the walls at the back of each being wrought in stucco, form the entrance to a court, having for its pavement compartments of mosaic; which are enclosed by a dwarf-wall, and likewise present seats disposed at equal distances.

In the centre of this court is a fountain, which renders the air particularly cool and refreshing. At its extremity, and fronting the pavilion, an open vestibule, supported by columns, precedes the different apartments of the ground story of the principal building, above which rises a second story. The interior of the vestibule and apartments, is decorated with mosaics, stuccoes, bassi-rilievi, and paintings; beautiful both in their composition and execution. At the summit of the building is a small Belvedere, which commands an enchanting view of the surrounding scenery.

The gardens of the Villa Pamfili are entered by avenues bordered with flowering shrubs; when after having passed a retired and shady spot, rendered sombre by the thickness of the surrounding foliage, an elegant pavilion presents itself; and an extensive plantation of rare trees, bounding a lawn, which serves as pasturage to a number of animals of different kinds. An immense terrace sustains the rising gardens level with the second story of the casino; and the extremity of the extended superficies, in face, is terminated by a

second terrace. Proceeding on, are clusters of foreign shrubs; and beyond, pine and fir trees form a mountain of evergreen foliage. The almost infinity of agreeable scenes and effects that these enchanted grounds present, are too numerous to be described. On arriving at the most elevated point, in order to leave the gardens of the Villa Pamfili, what an imposing spectacle offers itself! The whole of modern, together with the ruins on ancient Rome, and the surrounding country, are developed to the astonished sight.

The situation of country residences requires two essential qualities; salubrity and agreeableness. The proximity of marshes, boggy ground, or stagnant water, should be avoided. An eminence is the most suitable, being out of reach of unwholesome fogs, which rise from low grounds; at the same time affording an extensive view of the surrounding country, and of the rustic occupations applied to their cultivation.

Country residences situated upon a moderate eminence, possess a further advantage, if near the banks of a fine river, or a lake, or in the vicinity of a bay formed by the sea, acquiring not only agreeable distances, but becoming, from the nature of their site, the most imposing parts of the picture that the landscape presents.

The most general observations as regards aspects in our own country, are, that the south-east is the most esteemed; and that the south and due east rank next. Again, the south-west is regarded as the most objectionable, because the rains proceed more from that point than any other. An aspect due north or west, has equally a disadvantage; the former from being deprived of the sun, and the latter by being incom-

moded with it, during a considerable portion of the day.

Neatness, order, and taste, ought to constitute the ruling features around villas and country residences; and should present objects in which art, divested of all appearance of constraint, affords as great a degree of comfort as of pleasure. As the grounds immediately adjacent to the residence may be considered to form a part of the site which it occupies, they may be distributed with regularity, governed by the plan of the seat; and prolonged in a right line towards the entrance or avenue. The total negligence of regularity offends the sight; for the architectural composition of a villa is an object of sufficient importance, to influence the observance of symmetry at least in the space immediately connected with and surrounding it. These parts, in extensive villas, may be embellished with statues, vases of flowers, and other suitable objects.

It has been customary to enrich the area in front of country seats, with fountains and orange trees. These two objects doubtless contribute to render them agreeable and refreshing. The site ought not to be covered with buildings, or lofty and thick trees; as they deprive the landscape of one of its most pleasing features, openness of view.

As the principal motive in the erection of country seats, is to possess an uninterrupted enjoyment of peaceful pleasure; it follows that no object should be placed in their environs, but such as are capable of producing agreeable sensations. Thus they ought not to be immediately surrounded by a number of constructions, as barns, stables, &c.; the best situation for which, is, at a short distance from the residence.

Villas are distinguished from country residences, by their greater extent, dignity, and magnificence. Country seats of the first order, inhabited by persons of distinction, approach the nearest to them.

Although villas serve as habitations for princes, they do not require either the same extent, dignity, or sumptuousness as palaces, situated in capitals. In the villa, a sovereign resigns, as may be said, the public character that he holds in the midst of his people.

It is otherwise with the country seats of nobles, because they more particularly serve them as their ordinary abodes. They reside on their estates, where their presence seems almost indispensable. The country is where their interests and influence are greatest; and therefore their habitations may with propriety be more magnificent than in the capital. Therefore the character of the country seats of nobles, consists in a mixed though somewhat limited expression of dignity and magnificence.

Country residences of persons of quality, may be distinguished by a character of elegance.

The country houses of tradesmen should be respectable and pleasant; and an expression of moderation and dignified modesty, be predominant.

A few remarks may, in the present instance, be offered on those species of constructions named cottages; exhibiting at their exterior, clay walls and roofs thatched with straw; whilst their interior presents all the luxuries of life. This humble roof, and its mossy walls, are but a disguise employed by luxury, to awaken by an unexpected contrast, the exhausted allurements of its impotent charms. Such is doubtless the object proposed in this species of

productions—which, in misleading the expectation under the external appearance of the most rustic simplicity, exhibits interiorly, a display of marbles, gilding, paintings, the most costly furniture, and all the refinements introduced into modern life.

It cannot be requisite to follow this subject further, in order to prove its absurdity; as it must be admitted that unity of character, or analogy of taste, demands a relativeness between the interior and the exterior o all buildings.

In designing a country residence, attention should be paid, not only to the general and suitable character of these kinds of buildings, but likewise to the particular character which the composition ought to present, according to the differences which have just been enumerated; from which should be determined the choice of the materials, method of construction, and also the decoration of all the parts interior and exterior.

Presupposing all that is necessary for a habitation, together with whatever may contribute to the convenience of its distribution, which vary according to the ideas or wants of the proprietor, it is requisite, first, as connected with the ordonnance of the building, inasmuch as it is intended to be submitted to the rules of taste, to direct the attention to its general form.

The more simple it may be, the less it will divide the attention of the spectator, and the more striking will be its advantages. Any complicated form is productive of less effect than one which is simple. No property contributes more to the beauty of architecture than this. The total mass of a building ought, then, to present, a unique, undivided, and complete form; producing on the sight an agreeable sensation.

In general the rectangular form is to be preferred; being more convenient for interior distribution, and as before observed, it offers a pre-eminent simplicity, which permits the sight to observe the accord of the exterior sides, and the proportions of the lines, with facility. A plan having a proportion of about three times or more the length in front than at the sides, fails considerably in the effect it is intended to produce; as also does that which presents the contrary extent in sides with regard to the front.

A plan of a square form suffices for an elegant country residence. Those of greater extent, may offer a total, composed of several squares; or after the Italian manner, presenting four ranges of buildings of equal length; or again, according to the French method, in which the court is formed by means of three ranges; that is, by a front and two wings in projection. The first mode possesses considerable dignity, and is still more suitable when the building is composed of several stories; the second is more open and less confined; the wings of which may be arranged so as to be of less elevation than the centre part provided they be well proportioned and of a suitable extent.

The façade should be analogous to the character of the building; presenting a dignified simplicity, to which a degree of magnificence may be added, according to the class in which it is placed. It should not be divided and separated by a variety of insulated parts; nor covered with superfluous ornaments which hide the principal parts; nor encumbered by accessories that divert the eye from the beauty of the total, nor should it present a multitude of angles and pro-

jections, which destroy the impression of unity that the whole ought to convey. The entrance should be elegant, and situated in the centre of the façade.

Windows, exclusively of their necessity, are a further means of embellishing these elevations. Their number depends on the interior convenience of the building, and on the decoration of its exterior. If there be too few, it causes a dull appearance in the interior; on the other hand, the multiplicity of windows divides the exterior into too great a number of small parts, thereby diminishing the idea of solidity, which is so indispensable for the good effect of the building; and it attenuates the impression of a necessary degree of dignity and simplicity. The proportionate size of windows, should be governed by that of the story in which they are situated.

Colonades or piazzas have, in Italy, been attached to the body of buildings, affording a promenade sheltered from the rain or sun; offering an agreeable place for repose, besides giving to the total a lively and magnificent aspect, they further allow of having covered galleries above. If their employment be admissible, it is only in villas of the first order.

The roof never contributes any thing to the beauty of a building; but when its conspicuous appearance cannot be avoided, its form should be such as not to injure the good effect that the whole would otherwise produce. The flatter or less raised the roof may be, the more agreeable it will appear. A simple roof is the best adapted for country residences. They may further have a roof in form of a terrace, or again one which has a portion left flat on each of its sides; serving after sun-set as an agreeable situation to enjoy

the distant prospects and the refreshing atmosphere; and it should be surrounded by an elegant and solid balustrade.

Turrets are not compatible with the expression of liberty and pleasure, which ought to characterize villas and country seats. They bring to mind those barbarous ages, when they sometimes served as fortresses, at others as magazines for plunder, and also for prisons.

The decorations that are added to the essential parts of villas and country seats, to increase the feeling of pleasure, require the same degree of judicious application as in other works of art. First, it is necessary that they be suitable to and harmonize with the buildings in general; that they appear as if the nature itself of their disposition had caused their origin; that they be susceptible of strengthening the effect of each essential part to which they may be added; and of rendering them still more agreeable to the sight. They should be distributed with judgment and economy; without injuring the impression which the essential parts ought to produce; so as not to hide their forms and also not to affect the simplicity, or interrupt the magnificence of the principal parts. It is necessary that they be conformable, both to the rank and fortune of the proprietor, and to the character of a country residence; presenting a relative signification. Lastly, they should accord with the particular character of the building; for an elegant country residence does not require the same degree of richness and the same number of ornaments, as villas and country seats, of the first class.

The exterior form and ordonnance ought to an-

nounce to the spectator, the determined character of country residences: and likewise, that on his entering, he beholds the same character distributed in the whole of the interior disposition and decoration.

The agreeable impressions produced by a judicious choice of decorations, and their perfect harmony, may be farther augmented by variety: for a dining room requires a style of decoration different from that of a bed-chamber, and the decorations are also different, both as regards the resources employed, and also in their execution. The decorations applicable to the interior, namely, vestibules, rooms, and apartments, together with those which appertain to the exterior of a building, consist in paintings, bass reliefs, vases, statues, &c., which should present a rural air, expressive of the liberty, pleasure, and gaiety, that reign in the country.

The employment of statues in the embellishment of villas and country seats, may considerably increase their beauty. They ought not only to present all the perfection of art, but likewise possess the power of awaking those ideas and sentiments, suitable to the situation. The statues of Jupiter, Mars, and Hercules, should not be placed where we expect to find those of the goddess of Peace, of Ceres, Bacchus, Pomona, and of Flora. The charms of the Graces, together with allegorical representations of the different periods of the day and year, may further serve to convey agreeable impressions.

In country residences, forming the medium class, the application of these means would be unsuitable: and still more so, in those that should present a more modest and simple style.

The remarks which have hitherto been offered on the subject of the different classes of country residences, have generally been confined to the principal building or habitation. Their total is composed of several other constructions that are less considerable; which are separated from it, sometimes for convenience, at others for pleasure, and also from the necessity of proportioning the principal mass to the extent of the site, and to the landscape of which it forms a part. This disposition may also furnish agreeable accidental effects in the composition; and it possesses advantages in many other respects, besides facilitating the interior distributions of the habitation, and affording an opportunity of removing from it those parts of the arrangement which are incommodious or disagreeable. Thus the stables and other constructions may be detached from the principal mass.

There are again others of these insulated buildings, which occupy a medium place between pleasure and utility. As a pavilion dedicated to the pleasures of the table; for the site of which should be chosen, a refreshing and shaded situation, that offers a delightful perspective; having in its vicinity a limpid stream, and also a grove. The apartment which it forms should be lofty and well lighted; and in its decoration, pleasure and taste ought to preside. The kitchen should be hidden in the shade of the surrounding foliage.

Another devoted to the dance and musical performances, requires neither a fascinating site, lengthened perspective, nor movement in the surrounding objects. The midst of a tranquil shade is its most suitable

situation. The character of its exterior should announce the uses for which it is employed, and with which its interior decoration should correspond.

A cabinet for study, requires a peaceful and retired situation, affording moderate light. Adjacent to which may be introduced a small rippling stream, that produces a soft murmur. It should offer varied and distant views, to refresh the mind and sight during the intervals of relaxation. A statue of the deity of the arts, or that of a philosopher, may be placed near its entrance. Simplicity ought to be the predominant feature in this building, and the ornaments, distributed with economy, should indicate the agreeable occupations of the Muses. A library may be considered as indispensable. Its environs should present retired walks; that by tranquillity and silence, they may invite the mind to meditation. As the serenity of morning is the most favourable for these pursuits, the east is the most advantageous aspect.

Another, for sleep, may be placed in the centre of a flowery shade. The stillness of the situation should announce it as being destined to repose; and aided by the scarcely perceptible sound of a purling brook, it may contribute to invite slumber. All objects in the environs should repose in favoured retirement, and present a kind of immobility: and at twilight the air should be perfumed by the surrounding flowers. The silvery light of the moon will only penetrate through the foliage of the neighbouring branches. The chamber should be situated so as to receive the first rays of the sun obliquely, and not to be all at once inundated by his broad light. Rural and agreeable paintings should ornament its walls.

Hunting boxes may be erected on grounds containing game. A habitation is not required, but simply a refuge against unfavourable weather; to take refreshment, and to rest, in case of fatigue, from the exercise of the sport. They require a dry, agreeable and exposed site. An elevated spot that overlooks the park, and from whence the eye may be enabled to trace the direction of the chase, is the best. These buildings require no appearance of magnificence, but merely convenience and neatness. The ordinary decorations, consisting of the horns of deer, may be replaced by more tasteful emblems; and by mythological paintings, that relate to the chase.

Other similar buildings, situated on particular grounds, are connected with fowling. Their site should be solitary and thickly surrounded with shrubs. In their vicinity should be sufficient and suitable nutriment for the birds; at the same time it should be arranged so as to present an agreeable appearance. These buildings require but a simple and small apartment, serving to make the little preparatives attendant on, as also for occasional retirement during, the sport.

Aviaries which are intended to contain different species of living birds, require a situation affording verdure, fresh water, and shade; as also one that is neither too humid nor too cold. They may be surrounded with a trellis wrought with wire, which should be of sufficient height to permit of the shrubs gathering underneath. A fountain composed of a single jet, placed at a convenient distance, would produce a refreshing sensation, and further aid to animate the scene. A small apartment, adjacently

situated, may serve as a pleasing retreat to observe the manners and habits of each of these interesting objects.

A rustic shed, open on all its sides, will afford suitable and agreeable accomodation for the enjoyment of the sport of angling. It ought to present in its construction considerable apparent negligence, as it permits of no species of decoration; it should be placed so as to project a little over the lake or basin on the borders of which it may be situated, and ought to be accompanied with a canoe or small bark.

A building employed as a bath should not be placed in an exposed situation. It ought to be in a retired and shady spot, overhung with foliage; through the leaves of which the mild rays of the setting sun, which is the most suitable aspect, may throw an agreeable light. Fragrant shrubs and flowers should here exhale their perfumes. Its architecture ought to be simple, and the roof low; there should be but few apertures, as also great reserve in the application of ornaments to its interior.

Rural constructions, besides the conveniences they afford, further serve to spread life and movement in the grounds where they are introduced. They take from them their uniform and deserted appearance, in shewing that they are inhabited by man. There is scarcely a situation but is suitable for some of them, nor grounds on which they would not form important objects. But to produce animation from their employment, it is necessary to restrict their number. For if they be too much multiplied, however conformable to the essential character of gardens, or suitable to augment the effects of sites, they will weaken the im-

pression of natural scenes, destroy all rural and retired appearance; and rather assume that of a small town or village, than a place dedicated to the beauties of nature.

Rural constructions may further be considered as objects susceptible of beauty; and as means of indicating, as also of strengthening, the character of grounds. First, beauty is indispensable to them, since they are intended to gratify the sight, recreate the imagination, and agreeably to occupy the mind. But it is not by their sumptuousness that this can be effected; it is obtained by the elegance of forms; by simplicity, be ease, and grace of ordonnance, and by an apparent consistency between the appearance of the building and its use.

Their site has considerable influence on the particular expression of beauty that ought to be applied. If the building be placed upon an eminence, and have all its sides exposed to view, its architecture should be elegant; other situations more or less picturesque, are favourable to the other devolopments of art.

Rural buildings, though often destined to serve as points of sight, ought sometimes, from other motives, to be entirely hidden. By this means very sudden and agreeable surprises may be produced. If, for example, they serve but for refuge or shelter; this idea may be adopted.

Rural buildings may also be regarded as affording means to characterize natural sites.

There is no person that, having cast an attentive glance on landscapes, has not remarked the impression which fabrics spread around them. It is the same as respects their introduction into gardens. They not

only determine the character of the grounds, but they likewise produce a new energy in them; and augment the degree of pleasure, gaiety, gravity or melancholy of the scenes, of which they form a part. An open rotunda situated upon an eminence, will increase the aerial character indicated by the tall and thinly planted shrubs which rise on its sides. A temple strengthens a solemn, a hermitage, a melancholy, and a thatched cottage, a rural character.

But if, instead of making the buildings accord with the character of each scene, a pavilion of a noble style be raised on a wild site, ruins on one that is level and highly cultivated, a cabinet for study adjacent to a principal walk or promenade, or a bath on the summit of an eminence; the laws of suitableness would manifestly be broken. To imagine that by such injudicious applications it would be possible to change the character of a site, would be an error; a building strengthens, but does not change it.

When a number of these buildings are introduced into grounds, they should be distinguished by the diversity of their forms and appearance, and all symmetry and equality of position between them ought to be avoided. For although a building, inasmuch as it is an architectural production, requires in its composition an exact observance of symmetry; nevertheless this rule cannot be extended to the situation, distance, and position of a number of rural buildings; each of which forms an insulated total; is independent of the others; and governs the particular portion of the grounds belonging to it. They may concur in producing a rich perspective, may present to each other a harmonious relation, and an agreeable connexion

with the surrounding objects, without being symmetrically disposed.

A capricious medley of the architecture of different nations should be carefully avoided. There ought not to be placed in the same perspective, an Egyptian obelisk, a Grecian temple, a Roman monument, a Gothic tower, and a Chinese pavilion; though this species of extravagance does exist in several parks in this country. This monstrous assemblage of, and confusion in, productions which differ both in time and place, that so ill accords with the charms of nature and the simplicity of pleasure grounds, can only have been the result of a perverted taste, and an inordinate mania for imitation.

Rural constructions may be further extended in their use, by being dedicated to the memory of a person, or of some object. In this case, that which it is intended to commemorate, should not only merit the distinction, but likewise its character ought to be consonant with the ideas and emotions peculiar to rural retirement. To prevent these objects from failing in their effect, it is necessary that they be strongly characterized by their ordonnance and situation. Their signification should not only be unequivocal, but it should be sufficiently evident to be understood without much consideration. The general expression may be increased by exterior emblems; but such resources should not constitute the sole means of imprinting on architectural productions, the character of truth and harmony.

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A
GLOSSARY
OF ARCHITECTURE.

ABACUS.—The uppermost part or crowning member of the capital of a column. Its form differs according to the orders. In the Tuscan, Doric, and Ionic, it is square in its plan; in the Corinthian and Composite, its faces present a sweep, or curvature, which is called the *arch* of the abacus, the centre of which is ordinarily decorated with a rose or some other similar ornament. The angles of this member, in the two last-mentioned orders, are cut off in a corresponding direction with the radius of the *arch*, and are named the *horns* of the abacus.

The proportion of the abacus in the early examples of the Doric order, is about half the total height of the capital; but in the Doric examples of a later date, as also in the rules ordinarily observed by the modern masters, the height of the Doric abacus, as also that of the Tuscan and Ionic, is nearly one-third of that of their capitals. The height of the Corinthian and Composite abacus, is in general one-seventh of the capital. More than ordinary care, however, is requisite in the proportion of the abacus of these orders, so as to preserve the beauty and harmony which these capitals ought to present.

ABBEY.—A religious establishment of a number of persons of either sex, governed by an abbot or abbess.

ABELE TREE.—The wood of this tree which is of the white poplar kind, is of a very regular texture; its colour is white, occasionally mixed with a shade of brown. This species of wood, when employed for such purposes as ensures its being kept dry and free from moisture, is equally as durable as pine. The weight of a cubic foot of abele, when well seasoned is $32\frac{1}{2}$lbs., and the cohesive force of a square inch is about 5711 lbs.: it is almost $\frac{15}{100}$ tougher than oak, without possessing more than $\frac{7}{10}$ of its stiffness.

ABREUVOIR.—Any joint in masonry which is ordinarily filled with mortar or cement. The same word is also often employed to signify a watering place for cattle.

ABSIS.—See Apsis.

ABUTMENT.—The masives of masonry constructed on the banks of a river, to resist the entire thrust of the bridge, and to serve as springing points to the arch, of which it may be formed, or each of those by which it is terminated, when composed of several arches. These are termed *artificial abutments*. *Natural abutments* are rocks, the situation and solidity of which, are found to be sufficient for ordinary purposes without the aid of masonry.

The twofold office for which abutments are required, necessitates their being constructed with the greatest solidity. As regards the dimensions which should be given to abutments, the most essential one to determine, is their thickness; this dimension ought to be proportionate, firstly, to the span of the arches for which these abutments serve as sprining points;—secondly, to the form of the arches; and, thirdly, to the height of the main land, and solidity of the matter of which it is composed.

When a bridge is composed of several arches, the thrust acting against the abutments, increases in proportion to their number and the thickness of the piers; when this thickness is insufficient to resist the thrust of the arches which spring from them.

To determine with precision the thickness which it is necessary to give to piers and abutments, recourse must be had to complicated operations. As these operations require a knowledge of mathematics which all practical men are not possessed of, the following tables are given, not as a safe substitute for experience, but as being not altogether devoid of interest.

A TABLE

TO DETERMINE THE THICKNESS OF ABUTMENTS AND PIERS, TO SUPPORT SEMI-CIRCULAR ARCHES.

Span of the arches.	Heights of the piers from their foundations, or footings, to the spring.		Thickness of the arches at their key.			Thickness of the piers and abutments, the hanches, or flanks, being filled level with the extrados of the key.			Thickness of the piers and abutments; the arches having above their crown, gravel and pavement 15in. deep, the fall or declivity being 1½ in. in 6 feet.		
feet	feet	in.	feet	in.	lines	feet	in.	lines	feet	in.	lines
3	3	0	1	1	3	1	5	5			
	4	6				1	7	6			
	6	0				1	8	9			
6	3	0	1	2	6	1	10	6			
	4	6				2	1	4			
	6	0				2	3	4			

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Span of the arches.	Heights of the piers from their foundations, or footings, to the spring.		Thickness of the arches at their key.			Thickness of the piers and abutments; the hanches, or flanks, being filled level with the extrados of the key.			Thickness of the piers and abutments; the arches having above their crown, gravel and pavement 15in. deep, the fall or declivity being 1½in. in 6 feet.		
feet	feet	in.	feet	in.	lines	feet	in.	lines	feet	in.	lines
9	3	0	1	3	9	2	1	2			
	6	0				2	7	0			
	9	0				2	11	2			
12	0	0	1	5	0	1	4	7			
	3	0				2	4	9			
	6	0				2	11	9			
	9	0				3	4	5	2	8	3
	12	0				3	7	8	3	4	8
	15	0				3	10	1	3	10	5
	18	0				3	11	11			
	21	0				4	1	4			
	24	0				4	2	7			
18	6	0	1	7	6	3	7	10			
	9	0				4	1	9			
	12	0				4	6	1			
24	6	0	1	10	0	4	3	1			
	9	0				4	9	5			
	12	0				5	3	3			
30	6	0	2	0	6	4	10	1½			
	9	0				5	5	7			
	12	0				5	11	9			
36	6	0	2	3	0	5	4	10	5	9	11
	9	0				6	1	0	6	6	9
	12	0				6	7	8	7	2	1
42	0	0	2	5	6	4	0	8			
	6	0				5	11	5			
	9	0				6	8	0			
	12	0				7	3	3			
48	6	0	2	8	0	6	6	0			
	9	0				7	2	10			
	12	0				7	10	7			
	15	0				8	5	2			
54	6	0	2	10	6	7	0	4			
	9	0				7	9	7			
	12	0				8	5	8			
	15	0				9	0	9			

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Span of the arches.	Heights of the piers from their foundations, or footings, to the spring.	Thickness of the arches at their key.			Thickness of the piers and abutments; the hanches, or flanks, being filled level with the extrados of the key.			Thickness of the piers and abutments; the arches having above their crown, gravel and pavement 15in. deep, the fall or declivity being 1½in. in 6 feet.		
feet	feet	feet	in.	lines	feet	in.	lines	feet	in.	lines
60	6	3	1	0	7	6	8	7	11	4
	9				8	4	3	8	9	3
	12				9	6	7	9	6	1
	15				9	8	1	10	1	11
66	6	3	3	6	8	1	0			
	9				8	10	10			
	12				9	7	6			
	15				10	3	2			
	18				10	10	2			
72	6	3	6	0	8	7	4			
	9				9	5	4			
	12				10	2	2			
	15				10	10	2			
	18				11	5	6			
78	6	3	8	6	9	1	10			
	9				9	11	9			
	12				10	9	0			
	15				11	5	3			
	18				12	0	10			
84	9	3	11	0	10	5	11	10	10	4
	12				11	3	7	11	7	11
	15				12	0	1	12	4	8
	18				12	7	11	13	0	8
	21				13	3	1	13	8	1
90	9	4	1	6	11	2	4			
	12				11	11	6			
	15				12	8	1			
	18				13	4	0			
	21				13	11	4			
96	9	4	4	0	11	7	0			
	12				12	4	8			
	15				13	1	7			
	18				13	9	9			
	21				14	5	4			

A TABLE

TO DETERMINE THE THICKNESS OF ABUTMENTS AND PIERS, TO SUPPORT SEMI-CIRCULAR ARCHES.

Span of the arches.	Heights of the piers from their foundations, or footings, to the spring.	Thickness of the arches at their key.			Thickness of the piers and abutments; the hanches, or flanks, being filled level with the extrados of the key.			Thickness of the piers and abutments; the arches having above their crown, gravel and pavement 15in. deep, the fall or declivity being 1½in. in 6 feet.		
feet	feet	feet	in.	lines	feet	in.	lines	feet	in.	lines
102	9	4	6	6	12	1	5			
	12				12	11	2			
	15				13	7	3			
	18				14	4	7			
	21				15	0	5			
108	9	4	9	0	12	7	8	12	10	11
	12				13	5	8	13	9	0
	15				14	2	10	14	6	4
	18				14	11	4	15	3	1
	21				15	7	5	15	11	3
114	9	4	11	6	13	2	0			
	12				14	0	1			
	15				14	9	5			
	18				15	6	2			
	21				16	2	3			
120	9	5	2	0	13	8	4			
	12				14	6	5			
	15				15	4	0			
	18				16	0	10			
	21				16	9	2			
126	9	5	4	6	14	2	8			
	12				15	0	10			
	15				15	10	6			
	18				16	7	5			
	21				17	3	11			
132	9	5	7	0	14	8	11	14	11	2
	12				15	7	3	15	9	7
	15				16	4	11	16	7	5
	18				17	2	1	17	4	8
	21				17	10	8	18	1	5
138	9	5	9	6	15	3	2			
	12				16	1	7			
	15				16	11	1			
	18				17	8	8			
	21				18	5	5			

A TABLE

TO DETERMINE THE THICKNESS OF ABUTMENTS AND PIERS, TO SUPPORT SEMI-CIRCULAR ARCHES.

Span of the arches.	Heights of the piers from their foundations, or footings, to the spring.	Thickness of the arches at their key.			Thickness of the piers and abutments; the hanches, or flanks, being filled level with the extrados of the key.			Thickness of the piers and abutments; the arches having above their crown, gravel and pavement 15in. deep, the fall or declivity being 1½in. in 6 feet.		
feet	feet	feet	in.	lines	feet	in.	lines	feet	in.	lines
144	9	6	0	0	15	9	6			
	12				16	7	9			
	15				17	5	6			
	18				18	2	11			
	21				18	11	8			
150	9	6	2	6	16	3	8			
	12				17	2	3			
	15				18	0	3			
	18				18	9	8			
	21				19	6	8			
156	9	6	5	0	16	10	1	16	11	3
	12				17	8	8	17	10	0
	15				18	6	9	18	8	2
	18				19	4	4	19	5	9
	21				20	1	5	20	2	11
162	9	6	7	6	17	4	2			
	12				18	2	11			
	15				19	1	1			
	18				19	10	8			
	21				20	7	11			
168	0	6	10	0	14	10	7			
	3				15	11	2			
	6				16	11	2			
	9				17	10	5			
	12				18	9	3			
	15				19	7	4			
	18				20	5	2			
	21				21	2	5			
	24				21	11	4			

A TABLE

TO DETERMINE THE THICKNESS OF ABUTMENTS AND PIERS, TO SUPPORT ARCHES DIMINISHED TO ONE-THIRD OF THEIR SPAN IN HEIGHT.

Span of the arches.	Heights of the piers from their foundations or footings to the spring.	Lesser radii.			Principal radii.			Thickness of the arches at their key.			Thickness of the piers and abutments; the hanches, or flanks, being filled level with the extrados of the key.			Thickness of the piers and abutments · the arches having above their crown, gravel and pavement 15in. deep, the fall or declivity being $1\frac{1}{2}$in. in 6 feet.		
ft.	feet	feet	in.	l.	feet	in.	l.	feet	in.	l.	feet	in.	l.	feet	in.	l.
3	3	0	9	$9\frac{2}{3}$	2	2	$2\frac{1}{3}$	1	1	9	1	6	6			
	$4\frac{1}{2}$	0	9	$9\frac{2}{3}$	2	2	$2\frac{1}{3}$	1	1	9	1	8	4			
	6	0	9	$9\frac{2}{3}$	2	2	$2\frac{1}{3}$	1	1	9	1	9	5			
6	3	1	7	$7\frac{1}{3}$	4	4	$4\frac{2}{3}$	1	3	0	2	3	5			
	$4\frac{1}{2}$										2	6	9			
	6										2	9	1			
9	3	2	4	11	6	7	1	1	5	6	2	8	2			
	6										3	3	4			
	9										3	7	3			
12	0	3	3	$2\frac{1}{2}$	8	8	$9\frac{1}{2}$	1	7	4	1	8	10			
	3										3	2	4			
	6										3	11	3			
	9										4	4	7	3	9	2
	12										4	8	1	4	8	8
	15										4	10	9	5	3	11
	18										5	0	7			
	21										5	2	1			
	24										5	3	3			
18	6	4	10	10	13	1	2	1	10	10	4	10	3			
	9										5	5	5			
	12										5	10	6			
24	6	6	6	5	17	5	7	2	2	7	5	8	5			
	9										6	5	0			
	12										6	11	5			
30	6	8	2	$0\frac{1}{2}$	21	9	$11\frac{1}{2}$	2	6	0	6	5	9			
	9										7	3	7			
	12										7	1	12			
36	6	9	9	8	26	2	4	2	10	1	7	3	2	8	0	0
	9										8	2	0	9	0	3
	12										8	10	8	9	9	11
42	6	11	5	3	30	6	9	3	2	0	8	0	0			
	9										8	11	8			
	12										9	8	11			

A TABLE

TO DETERMINE THE THICKNESS OF ABUTMENTS ANE PIERS, TO SUPPORT ARCHES DIMINISHED TO ONE-THIRD OF THEIR SPAN IN HEIGHT.

Span of the arches.	Heights of the piers from their foundations to the spring.	Lesser radii.			Principal radii.			Thickness of the arches at their key.			Thickness of the piers and abutments; the hanches, or flanks, being filled level with the extrados of the key.			Thickness of the piers and abutments: the arches having above their crown, gravel and pavement 15in. deep, the fall or declivity being 1½in. in 6 feet.		
ft.	ft.	feet	in.	lines	feet	in.	lines	feet	in.	l.	feet	in.	l.	ft.	in	l.
48	6	13	0	10	34	11	2	3	5	8	8	8	[illegible]			
	9										9	8	0			
	12										10	6	8			
	15										11	3	2			
54	6	14	8	6	39	3	6	3	8	8	9	4	7			
	9										10	5	5			
	12										11	4	3			
	15										12	1	5			
60	6	16	4	1	43	7	11	4	0	6	10	4	0	10	9	0
	9										11	2	5	11	11	5
	12										12	1	10	12	11	8
	15										12	11	8	13	10	2
66	6	17	11	8¼	48	0	3¾	4	4	0	10	9	2			
	9										11	11	0			
	12										12	10	11			
	15										13	9	3			
	18										14	6	3			
72	6	19	7	3½	52	4	8½	4	7	6	11	5	7			
	9										12	7	10			
	12										13	8	2			
	15										14	6	11			
	18										15	4	5			
78	6	21	2	11	56	9	1	4	11	6	12	1	8			
	9										13	4	4			
	12										14	5	0			
	15										15	4	4			
	18										16	2	3			
84	9	22	10	6	61	1	6	5	3	0	14	1	0	14	9	1
	12										15	2	3	15	10	10
	15										16	1	10	16	11	0
	18										17	0	3	17	9	11
	21										17	9	7	18	7	9

A TABLE

TO DETERMINE THE THICKNESS OF ABUTMENTS AND PIERS, TO SUPPORT ARCHES DIMINISHED TO ONE-THIRD OF THEIR SPAN IN HEIGHT.

Span of the arches.	Heights of the piers from their foundations to the spring.	Lesser radii.			Principal radii.			Thickness of the arches at their key.			Thickness of the piers and abutments; the flanks being filled level with the extrados of the key.			Thickness of the piers and abutments; the arches having above their crown, gravel and pavement 15in. deep, the fall or declivity being 1½in. in 6 feet.		
ft.	ft.	feet	in.	l.	feet	in.	lines	feet	in.	l.	ft.	in.	l.	ft.	in.	l.
90	9	24	6	1⅓	65	5	10⅔	5	6	9	14	9	4			
	12										15	11	8			
	15										16	10	9			
	18										17	9	8			
	21										18	7	4			
96	9	26	1	8⅔	69	10	3½	5	10	0	15	5	2			
	12										16	7	0			
	15										17	7	3			
	18										18	6	5			
	21										19	4	6			
102	9	27	9	4	74	2	8	6	1	10	16	1	8			
	12										17	3	8			
	15										18	4	5			
	18										19	3	10			
	21										20	2	4			
108	9	29	4	11¼	78	7	0¾	6	5	5	16	9	10	17	4	11
	12										18	0	2	18	7	8
	15										19	1	1	19	9	1
	18										20	0	11	20	9	4
	21										20	11	8	21	8	5
114	9	31	0	7	82	11	5	6	9	2	17	6	2			
	12										18	8	8			
	15										19	10	0			
	18										20	10	0			
	21										21	9	1			
120	9	32	8	2	87	3	10	7	0	6	18	2	2			
	12										19	4	11			
	15										20	6	4			
	18										21	6	9			
	21										22	6	1			
126	9	34	3	9⅓	91	8	2⅔	7	4	4	18	10	5			
	12										20	1	5			
	15										21	3	1			
	18										22	3	9			
	21										23	3	5			

A TABLE

TO DETERMINE THE THICKNESS OF ABUTMENTS AND PIERS, TO SUPPORT ARCHES DIMINISHED TO ONE-THIRD OF THEIR SPAN IN HEIGHT.

Span of the arches.	Heights of the piers from their foundations to the spring.	Lesser radii.			Principal radii.			Thickness of the arches at their key.			Thickness of the piers and abutments; the flanks being filled level with the extrados of the key.			Thickness of the piers and abutments; the arches having above their crown, gravel and pavement 15in. deep, the fall or declivity being 1½in. in 6 feet		
ft.	ft.	feet	in.	lines	feet	in.	lines	ft.	in.	l.	ft.	in.	l.	ft	in.	l.
132	9	35	11	$4\frac{1}{2}$	96	0	$7\frac{1}{2}$	7	8	0	19	6	7	20	1	0
	12										20	9	10	21	4	6
	15										21	11	8	22	6	9
	18										23	0	6	23	7	11
	21										24	0	5	24	8	2
138	9	37	6	$11\frac{2}{3}$	100	5	$0\frac{1}{3}$	8	11	6	20	2	8			
	12										21	6	0			
	15										22	8	1			
	18										23	9	2			
	21										24	9	4			
144	9	39	2	$7\frac{1}{4}$	104	9	$4\frac{3}{4}$	8	3	4	20	10	11			
	12										22	2	4			
	15										23	4	9			
	18										24	6	0			
	21										25	6	4			
150	9	40	10	$2\frac{1}{3}$	109	1	$9\frac{2}{3}$	8	7	0	21	6	11			
	12										22	10	6			
	15										24	1	0			
	18										25	2	6			
	21										26	3	1			
156	9	42	5	$9\frac{2}{3}$	113	6	$2\frac{1}{3}$	8	10	6	22	3	0	22	8	7
	12										23	6	9	24	0	8
	15										24	9	5	25	3	7
	18										25	11	1	26	5	6
	21										26	11	1	27	6	6
162	9	44	1	5	117	10	7	9	2	4	22	11	3			
	12										24	3	1			
	15										25	5	11			
	18										26	7	10			
	21										27	8	9			

A TABLE

TO DETERMINE THE THICKNESS OF ABUTMENTS AND PIERS, TO SUPPORT ARCHES DIMINISHED TO ONE-THIRD OF THEIR SPAN IN HEIGHT.

Span of the arches.	Heights of the piers from their foundations to the spring.	Lesser radii.			Principal radii.			Thickness of the arches at their key.			Thickness of the piers and abutments; the flanks being filled level with the extrados of the key.			Thickness of the piers and abutments; the arches having above their crown, gravel and pavement 15in. deep, the fall or declivity being 1¼in. in 6 feet.		
ft.	ft.	ft.	in.	l.	feet	in.	lines	feet.	in.	lines	feet	in.	lines	feet.	in.	l.
168	0	45	9	0¼	122	2	11¾	9	5	9	18	11	8			
	3										20	7	6			
	6										22	1	11			
	9										23	7	1			
	12										24	11	1			
	15										26	2	1			
	18										27	4	1			
	21										28	5	3			
	24										29	5	7			
174	12	47	4	8	126	7	4	9	9	0	25	6	10			
180	12	49	0	3	130	11	9	10	0	0	26	2	9			
215	12	57	2	4	152	9	8	11	6	0	29	7	3			
240	12	65	4	4	174	7	8	13	0	0	32	11	5			
270	12	73	6	5	196	5	7	14	6	0	35	11	4			
300	12	81	8	5	218	3	7	15	0	0	38	11	3			

In the construction of a bridge composed of several arches, a less thickness may be given to the piers by increasing that of the abutments, This is often practised, in order to change as little as possible the current of the river, and to render the navigation easy. Thus for a bridge having arches 84 feet span, and 28 feet of a rise, the abutments and piers may have 14½ feet in thickness; but if it be required to diminish the thickness of the piers to 12 feet, it would be necessary to increase that of the abutments to 17 feet.

Abutment is also used by joiners and carpenters to signify a joint in which the grain of the two pieces of timber employed, runs at about a right angle; such is the joint of a brace with a truss-post.

ACACIA.—A wood of a yellow colour with a bluish shade; having its pores tinged with red. When well seasoned, it is of a hard and compact texture, and averages 50 lb. per cubic foot; its stiffness, strength, and toughness, being about equal to that of oak. The durability of acacia when employed in situations either to be constantly wet or dry, exceeds that of most other wood in ordinary use.

ACADEMY.—An edifice composed of several apartments for the use

of a society whose principal object is to promote the cultivation of one or more of the arts or sciences.

ACANTHUS.—The name of a plant, of which there are two species; the one wild, and the other cultivated; the latter is much imitated in architectural decoration. The Corinthian and Composite capitals, and particularly the latter, are most generally ornamented with this leaf.

ACCESSES.—*See* Corridor, Passage.

ACCESSORIES.—Any object entering into a composition without its being absolutely necessary, may be termed an accessory.

ACCIDENTAL POINT.—This, in perspective, is a point to which certain lines converge; the situation of which is determined by the position of the object intended to be represented.

ACCOUPLEMENT.—A framing of carpentry; also applied to signify a brace or tie.

ACROTERIA.—A species of pedestals often without base and cornice, employed to support statues or other decorative objects in the centre and at the extremities of pediments. According to Vitruvius the latter of these should have in height, half of that of the tympanum, and the one situated in the centre an eighth more. The same term is occasionally applied to the solid placed between the cornice and base of a balustrade.

ADMEASUREMENT.—The estimate of the labour and the materials used in the execution of any work.

ADYTUM.—A species of sanctuary in antique temples

ÆDES.—A lesser kind of sacred buildings, used amongst the Romans, and consecrated to some divinity; though not formally so by the augurs as were the temples.

ÆDICULA.—This word is used under several acceptations; sometimes to signify a small house, at others a building smaller than the ædes, but applied to the same purposes; as also to a species of shrine, containing the statue of a divinity.

ÆGICRANES.—The heads and skulls of rams and oxen, sculptured at the angles of antique altars, and on the metopes of the Doric entablature.

ÆOLUS.—In mechanics, a small portable machine, for renewing the air in rooms; adapted in its dimensions to supply the place of a square of glass in a sash window; and executed in such a compass as to project very little beyond the sash. This machine introduces only such a quantity of air as will make a room wholesome; and discontinues to work when the window or door is opened.

ÆRARIUM.—The name of the public treasury amongst the Romans.

AGORA.—*See* Forum.

AGREEMENT.—*See* Harmony.

AISLE.—When a church is divided, in a longitudinal direction, into three or five divisions, by ranges of columns or pillars, the centre division is termed the nave, and the others the aisles.

AIR-HOLES.—Apertures made to ventilate rooms, as also to renew the air in roofs and floors, in order to preserve the timbers from decay.

AIR-TRAP.—An aperture to admit the escape of foul air from sewers and drains.

ALABASTER.—A name indistinctively applied to two separate minerals, namely, the gypseous and the calcareous alabaster. Alabasters are more or less transparent, according to their quality; are of a granular texture, softer than marble, and not susceptible of being brought to so fine a polish.

Calcareous alabaster is of two kinds, the oriental and common; these are again distinguished by the variety of their colours. The common is found in France and Germany; and the oriental in Italy, Spain, and Egypt.

Gypseous alabaster, which is procured both in Derbyshire and Nottinghamshire, is employed to a great extent for the manufacture of what is termed plaster of Paris. This ingredient is of immense utility both in the constructive and ornamental branches of architecture; it is used as a very strong cement by the sculptor and mason, to form close joints of marble, and enters into many cements employed in construction. It is also employed for the forming of cornices, ornamented friezes, capitals, foliage, and many other decorative objects.

ALCOVE.—A recess formed in large apartments, fitted up with stationary seats. A light building forming a kind of arbour or summer-house in gardens. Its most appropriate application is, to signify a recess in a chamber, which is occupied by the bed.

ALDER.—A wood of a bright brown colour, of a uniform grain, and has the quality of great durability under water. In some places it is used for piles, in forming foundations in boggy parts, as also under the piers of bridges.

The white or common alder averages about 47 lbs. per cubic foot when well seasoned; it is as tough as oak, has four-fifths of its strength, and better than half its stiffness.

ALGEBRA.—A term signifying in general the art of comparing and equalizing quantities, and of resolving questions in arithmetic, where these operations are required. By algebra we discover a general form of expressing the results of all questions, including similar circumstances, relative to magnitude, quantity, or number; or in other words, by algebra we perform the several operations of addition and subtraction, of multiplication and division, employing not the common arithmetical cyphers, but other characters or symbols, of no real intrinsic value in themselves, but qualified to represent magnitudes, quantities, and numbers of every description. For example, let us suppose any number, as 4, to be represented by the letter a, and 5 to be signified by b, and their sum 9, to be signified by c: then in algebraic language a and b added together will be equal to c, or thus $a+b=c$; that is in this case $4+5=9$. But the values of the arithmetical symbols 4, 5, and 9, having by long and unvaried usage obtained specific determinate values they are not susceptible of any change; whereas the values affixed to the letters a, b, c, and the like, may be varied indefinitely, and operations performed by them still give correct results; thus a may stand for 12, b for 18, and c for their sum 30, then $a+b=c$, will represent $12+18=30$.

Although any letters of the alphabet may be employed to represent quantities in algebraic operations, yet it has been found convenient. fo

distinction's sake to use the letters in the beginning as a, b, c, d, e, &c., for quantities of which the values are given or known, and the letters at the end as v, x, y, z, for quantities neither given nor known, but which are required to be discovered. Thus in the foregoing example the values of a and b being given, and their sum required, we would say $a+b=x$.

Algebraic quantities are connected by certain signs as ($+$) *plus*, a term signifying *more*, denoting that the two quantities between which it is placed are to be added together; thus $4+5$ are equal to 9. The sign ($-$) *minus* or *less*, denotes that one of the quantities between which this sign is placed is to be subtracted from the other: thus $9-5$ is equal to 4.

The sign ($\times$) between two quantities signifies that they are to be multiplied together: as 4×5 are 20, or $a\times b=z$. The product of two or more quantities multiplied into one another is also represented by writing down the letters standing for them, close together as the letter in a word: thus the product of $a\times b$ is written ab, that of $a\times b\times c\times d$, is written $abcd$.

Division is represented by placing the dividend above the divisor, with a small line between them, as $\frac{a}{b}$: thus let a be 20, and b be 4, then $\frac{a}{b}=x$, the quotient or value of x will be 5.

Equality of quantities in value is signified by two parallel lines. Let a multiplied by b, be equal to c; it is expressed thus, $a\times b=c$.

When an arithmetical figure is placed before the algebraic symbols, it is then termed the numeral co-efficient, and distinguishes how often the algebraic quantity is to be repeated: thus $7n$ will signify the same number of times the value of n.

Quantities consisting of the same characters are said to be *like:* so $7an$ and $9an$ are *like* quantities; but $7an$ and $9ann$ are *unlike* quantities. Quantities having the same signs before them, whether plus $+$, or minus $-$, have *like* signs: but one having $+$, and another $-$, have *unlike* signs. Quantities with the sign plus $+$ before them are *positive*, and those with minus $-$ before them are *negative*. It is true that in the nature of things, a properly negative quantity cannot exist; but in algebra the expression is used to describe such quantities as are to be deducted from others with which they are connected. Thus the full measurement of a thing may be considered as a *positive* quantity, and that of its deductions as a *negative* quantity, which being deducted from the former will leave the true measurement. When no sign stands before an algebraic quantity, it is always considered to be positive, and to have the sign plus $+$.

ALLEY.—A walk traversing a garden, and conducting to the entrance of a building. A passage situated between main streets.

ALMS-HOUSE.—A building endowed by charitable individuals, for the reception and support of a particular description of poor persons.

ALTAR.—A table situated at the east end of Christian churches: the form of which is generally square, and raised one or more steps above the floor or pavement.

ALTAR-PIECE.—This word is sometimes applied to the entire architectural decorations of an altar; at others to the partition that divides

the altar and presbytery; as also to a scriptural composition executed in painting or sculpture, and situated behind the altar.

ALTAR-SCREEN.—A partition which serves to divide the choir from the presbytery.

ALTO-RELIEVO.—Is that relief in which almost the whole contour of the figures are detached from the ground of the material in which they are wrought, being only connected in a few places.

AMBULATORY.—A covered place, under which to promenade; one side of which is supported by columns or otherwise.

AMPHIPROSTYLE.—A temple having a range of four columns only, at the front and rear of its cella.

AMPHITHEATRE.—An antique edifice of extensive dimensions, and ordinarily of an oval form, used for the exhibition of different sorts of games. The exterior of these edifices generally presented two ranges of arcades, which served by means of corridors, to communicate with every part of their interior. From the arena in the centre, rose ranges of seats which ran parallel with the exterior wall.

Amphitheatre is also sometimes used to signify a lecture-room; the seats in these generally form a portion of a circle, and rise gradually above each other, leaving at the opposite extremity, a vacant place for the lecturer.

The same term is also occasionally applied to the area of a modern circus.

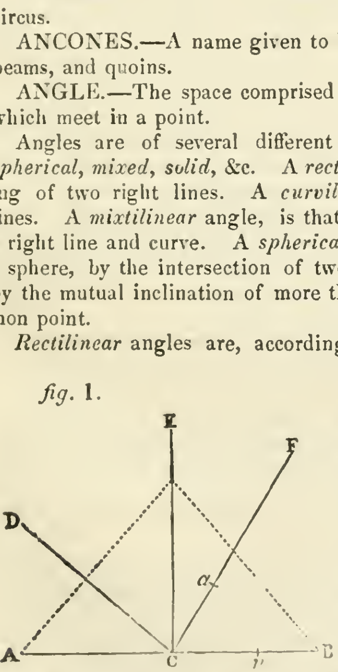
ANCONES.—A name given to brackets, shouldering pieces, cross-beams, and quoins.

ANGLE.—The space comprised between the surfaces of two planes, which meet in a point.

Angles are of several different kinds, as *rectilinear*, *curvilinear*, *spherical*, *mixed*, *solid*, &c. A *rectilinear* angle, is formed by the meeting of two right lines. A *curvilinear* angle, by that of two curve lines. A *mixtilinear* angle, is that which is formed by the meeting of a right line and curve. A *spherical* angle, is formed on the surface of a sphere, by the intersection of two great circles. And a *solid* angle, by the mutual inclination of more than two planes, meeting in a common point.

Rectilinear angles are, according to the magnitude of their angle, distinguished by the terms *right*, *acute*, and *oblique* angles. Thus in the adjoining fig. 1, the two right lines FC and BC meet in the point C, and their meeting is called the angle at C, or more correctly the angle FCB, or BCF: for in reading or naming an angle, the letter standing at the point of meeting, must be placed in the middle of the three. This is particularly necessary when more angles than one are formed at the same point, as in this figure; where the three lines DC, EC, and

fig. 1.



FC all meet AB in the point C: the angles made by these lines will therefore be read or named ACD, DCE, ECF, and FCB.

When one right line meets another in such a way that the openings on each side are equal, or when one line stands upon another lying horizontally, in such a way that if it were movable, it would have no tendency to fall over on either side; in these cases the first line is said to be perpendicular to the second, and the equal angles are called *right* angles. Thus in fig. 1, upon the horizontal line AB stands EC, such that the openings on each side are equal; that as the distances EA and EB measured equally remote from C, the point of meeting, are equal; in this case EC is perpendicular to AB, at the point C, and the two angles ACE and ECB being equal, are both right angles. But if the line FC meet AB in such a way that the angles are not equal, and consequently not right angles, the one as the angle FCA must be greater than a right angle, and the other FCB must be less, the greater is therefore said to be *obtuse*, and the less *acute*. Angles like all other magnitudes may be augmented or diminished; thus the angle ACE is made up of the two angles ACD and DCE; and if to these we add the angle ECF, we have the whole angle ACF equal to the three angles ACD, DCE, and ECF. It is always to be remembered that in speaking of angles, we mean nothing more than the mere opening formed by the meeting of two lines, without in the least taking into consideration the lengths of those lines; thus the angle FCB is of the same magnitude, whether the lines forming it be in length only from C to *a* and *n*, or to F and B, or to points at any distance from the angular point.

Adjacent angles, are the two angles formed by one line meeting another, any where, except at its extremities; such are the two angles FCA and FCB in fig. 1. These angles are said to be supplements to each other, their sum being equal to two right angles.

Vertical, or *opposite* angles, are those whose planes or lines form mutual continuations of each other; such angles are invariably equal.

Alternate angles, are such as are formed on the opposite sides of a line cutting two other lines; and supposing those two lines to be parallel, the alternate angles will then be equal.

External angles, are those formed by the exterior sides of any right-lined figure; and the sum of all the angles in such, is equal to four right angles.

Internal angles, are those within a figure, formed by the meeting of two of its adjacent sides; and their sum, in any right-lined figure, is equal to twice as many right angles as the figure has sides, deducting four.

Angle at the centre of a circle, is one whose angular point is at the centre.

Angle at the circumference, is that whose angular point is in any part of the circumference. An angle at the centre is double an angle at the circumference, when both stand on the same arc.

Angle in a semicircle, is an angle at the circumference contained in a semicircle, or standing upon a semicircle or diameter; and it is a right angle. An angle in a segment greater than a semicircle, is less

than a right angle. An angle in a segment less than a semicircle, is greater than a right angle.

Problems.—I. fig. 2 and 3. At a point, as D, of a right line DE to make an angle which shall be equal to a given angle BAC. On A, as a centre, with any convenient opening, the larger the better, describe the arc *ab*; with the same precise opening, from D describe the arc *de*: take in the compasses the space *ab* and set it up from *d* to *e*, and from D through *e* draw the line DF, which will, with the given line DE, form the angle FDE equal to the given angle CAB, as was required.

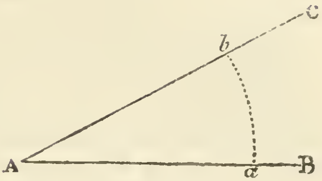


fig 2.

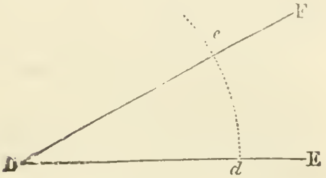


fig. 3.

II. fig. 4. To bisect, or cut into two equal parts a given angle ABC. On B, as a centre, describe the arc *ac*: from these points make an intersection at *m*: a line joining B and *m* will cut the angle ABC into two equal parts; consequently the angle AB*m* will be equal to the angle *m*BC. The same line B*m* also bisects the small arc *ac*, in *n*; so that *an* is equal to *nc*.

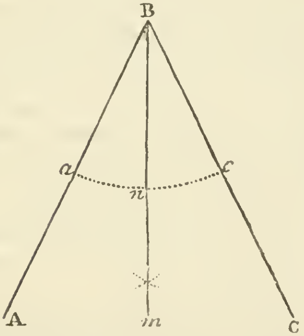


fig. 4.

To measure an angle on paper, place the centre of a protractor to the vertex of the angle, in such a manner that the radius may answer to one of the lines; and the degree given by the other line, will be the measure of the angle required.

ANGLE-BAR.—A term used in joinery to signify an upright piece of wood placed at the angles of projecting windows, of a polygonal or circular form.

ANGLE-BEAD.—A small slip of wood worked round on one side to nearly three-fourths of a circle, when intended for a single bead; if composed of more than one, that in the centre is always the largest, so as to form the angle; this is fixed to bond timber or plugging, at the projecting or external angles of interior walls, in order to ensure their preservation. Sometimes the angle-bead is employed only to the height of about six feet; the rest of the angle being wrought in plaster. At

other times it is either worked to an aris with the wall, or entirely omitted.

ANGLE-BRACE, ANGLE-TIE, DIAGONAL-TIE.—A piece reaching across the angles of a square frame, making the opening an octagon.

ANGLE-BRACKET.—A kind of bracket placed in the extremity of an angle.

ANGLE OF A WALL.—The line where the two sides of a wall or building meet.

ANGLE-RAFTER, HIP-RAFTER.—A piece of timber situated on the line formed by the junction of the two sides of the roof.

ANGLE-RIB.—A light piece of timber, forming a curve, which is fixed in the angle between the wall and ceiling when intended to form an arched ceiling.

ANGLE-STAFF.—*See* Angle-bead.

ANGLE-STONES.—Stones forming the angles of buildings, and employed to strengthen or ornament them. *See* Quoins.

ANGLE-TIE.—*See* Angle-brace.

ANNULAR-MOULDINGS.—All rounded mouldings, or whose section at a right angle forms a greater or less portion of a circle.

ANNULAR-VAULT.—A vault springing from two walls, which in their plan, form any portion of a circle.

ANNULETS.—Small fillets, such as are placed under the echinus or quarter round of the Doric capital.

ANTA.—A species of pilaster, having a very trifling projection from the wall, which were in the antique temples of Greece, situated at their exterior angles, and are sometimes termed angular antæ, presenting two entire faces. They were also used behind, and corresponded with the columns forming the porticoes of the temples; the capital and base of the antæ being in general without any conformity to those of the order with which they were employed.

Anta, is applied by some to those projecting faces, resembling the ends of walls, or the sides of pillars, without either base, capital, or any other mouldings.

ANTE-CHAMBER.—A chamber leading to the chief apartment. The *first ante-chamber*, or hall, is intended for domestics. The *second ante-chamber*, is more ornamented than the first, and is employed for the reception of such persons as may have business with the master, and sometimes also serves for a dancing or an eating room. The *third* kind of *ante-chamber*, is a species of cabinet, boudoir, or small saloon, attached to grand or principal apartments; and which, on levee days, is used for the reception of individuals of distinction, until the opening of the saloon; its style of decoration should be elegant.

ANTE-MURAL.—A palisade or wall forming an inclosure.

ANTE-PAGMENTA, PEGMATA.—The two moulded jambs and traverse piece, which form the frame of a doorway.

ANTE-ROOM.—A room leading to a principal apartment.

ANTE-COUR.—A court serving as passage to the principal court of an edifice or house, and also sometimes to the offices.

ANTICUM.—An entrance door with a portico at the rear or south

end of the antique temples ; and also applied to the space between the columns and the wall of the cella.

ANTIQUE.—A term used to signify all productions of the Arts executed from the time of Alexander, to the end of the sixth century.—*See* ARCHITECTURE.

ANTONINE COLUMN. TRAJAN COLUMN.—The Trajan column at Rome is constructed of white marble, consisting of thirty blocks ; eight of which form the pedestal, nineteen the column, and three the basis of the statue, with which it was surmounted.

The length of the lower plinth of the pedestal is 20ft. 3in. which is formed of two blocks 4ft. $5\frac{7}{8}$in. in height. The lower part of the door is in one of the longer sides of one of these stones, and their joint is consequently at right angles with it.

Upon these blocks lie two others 5ft. $6\frac{7}{8}$in. in height which terminate the door, their upper edge ranging with the bottom of the inscriptions.

Two other courses above these, the height of which is 4ft. $5\frac{2}{8}$in. and the upper bed of which reaches to the underside of the cornice of the pedestal.

Two more which form the cornice, and the curved plinth below the torus of the column, have in height 6ft. $4\frac{1}{2}$in.

The several heights of these blocks, make the height of the pedestal and before-mentioned plinth, 20ft. $10\frac{1}{2}$in.

In this pedestal are 32 steps, all of which are wrought in the solid blocks of which it is constructed; *viz.* 6 in the first range, including the step at the door, 9 in the second, 7 in the third, and 10 in the fourth.

The torus of the base of the column is formed of a single block ; the height of which is 5ft. 1in. ; in which are wrought 8 steps, having a newel in the centre.

Upon this, 17 cylindrical blocks are placed, forming the shaft of the column ; having 8 steps with a newel wrought in each ; the respective heights of these courses are, as follows :—

5ft. $0\frac{6}{8}$in.	5ft. 11 in.	5ft. $0\frac{6}{8}$in.	4ft. $11\frac{7}{8}$in.	4ft. $11\frac{6}{8}$in.
5 $0\frac{4}{8}$	4 11	5 $0\frac{6}{8}$	4 $11\frac{5}{8}$	5 $0\frac{7}{8}$
5 $0\frac{6}{8}$	4 $10\frac{3}{8}$	4 $10\frac{7}{8}$	4 $10\frac{5}{8}$	4 $11\frac{3}{8}$
4 $11\frac{4}{8}$	5 1			

Above these is another block, which forms the capital ; it is 4ft. $11\frac{6}{8}$in. in height, and the side of the square abacus, is 14ft. $0\frac{7}{8}$in. ; this like the preceding also contains 8 steps.

The height of the column from the under part of the torus of the base, to the upper face of the capital is 95ft. $0\frac{1}{8}$in. and that of the pedestal 20ft. $10\frac{1}{2}$in. ; hence the total height is 115ft. $10\frac{5}{8}$in. The courses are laid without mortar, but still present all possible solidity ; the joints being wrought to a most astonishing degree of accuracy.

The number of the steps to the summit of the capital which serves as a balcony, is then 184.

The first block above the balcony is 4ft. $11\frac{3}{8}$in. in height, and its diameter, taken at its plinth, is 10ft. $1\frac{1}{1}$in. ; the thickness of the shell at the same part is 1ft. $2\frac{1}{2}$in., and the length of the highest step is 2ft. $4\frac{1}{2}$in. ; which leaves for the diameter of the newel 2ft. $11\frac{1}{2}$in. ; which is the general diameter of the newel from the pedestal.

Above the last mentioned block is another, the height of which is 3ft. $8\frac{1}{2}$in., upon which another is situated that is somewhat higher than the last mentioned, and which immediately sustains the brass statue with which this column is at present surmounted; but, however, as both this last block and statue are modern, their dimensions are of little importance.

It has been asserted that the bassi-relievi on the shaft of this column, increase in their dimension in proportion as they ascend, in order to appear all of the same size to the spectator. This, however, is erroneous, as the casts from the column in the possession of the French Academy at Rome prove; in which some of the most prominent figures situated at the lower part of the shaft measure 2ft. 1in. The greatest height of any of the figures upwards is 2ft. 4in., which is the dimension of one better than half way up the shaft. The general size is 2ft. 1in., and but few measure 2ft. 2in. The height of these spiral bassi-relievi, or the distance between the two fillets, is not of an exact conformity, it being in some parts 3ft. 9in., and in others 4ft. 4in.; without presenting any regularity of increase upwards, the narrowest being that which is situated at the distance of ten feet from the summit.

The column of M. Aurelius, commonly called the Antonine, presents a general conformity to that of Trajan; but it has suffered much more from time and accidents.

The circular steps in the pedestal descend below the level of the plinth, down to its foundations; and the exterior masonry of the pedestal appears to be of a more modern date than the rest. In this pedestal from the level of its plinth are 37 steps, and its height is 25ft. $8\frac{5}{8}$in. Above the pedestal are, as in the Trajan column, 19 blocks; in each of which are 8 steps, the whole being in height 97ft. $0\frac{7}{8}$in., making a total height, including the pedestal, of 122ft. $9\frac{1}{2}$in.

The height of the capital is 5ft., and the square of the abacus, the upper part of which serves as balcony, is 17ft. $4\frac{3}{8}$in.

Above the capital, is a cylindrical block of 6ft. $0\frac{1}{2}$in.; the diameter of which at its plinth, is 12ft. $7\frac{7}{8}$in., and the thickness of the shell at the same part is 2ft. 2in.; the length of the highest step being 2ft. $5\frac{3}{4}$in. having for the diameter of the newel, which appears to be the same all the way down, 3ft. $4\frac{3}{8}$in. Immediately above the base of this block, there is a diminution of $5\frac{3}{4}$in., and near the upper beds, one of $11\frac{1}{2}$in. Upon this is another block, which is at present surmounted by the brazen statue of St. Paul.

The thickness of the shell of the column varies from 1ft. 8in. to 1ft. 9in., its diameter being 11ft. 10in., and presents but little diminution upwards.

APARTMENT.—A suite of rooms apart from the rest of the house, consisting of a hall, ante-chamber, chamber, cabinet, wardrobe, closet, rooms for servants, together with the requisite offices, as kitchen, &c.; forming of themselves a complete habitation, though only part of a house, As this arrangement is but seldom practised, the word *apartment* is almost entirely confined to signify a single room.

Palladio states, that the finest forms for apartments are seven in number; namely, the round, which are the most rare; the square; those whose length is equal to the diagonal of the square formed upon their

breadth; those of a square and a third; a square and a half; a square and two thirds; and lastly, of two squares: and that the best proportion for the height of these different apartments, when they have flat ceilings, is in giving their breadth for their height. But if those that are square in their plan be terminated by semicircular or vaulted ceilings, they should have one third more than their breadth to the key of the arch; and the height of those whose length is greater than their breadth, is given by adding the length to the breadth, and taking the half. For the different practical observations on this subject, *See* HALL, DINING-ROOM, CHAMBER, &c.

APERTURE.—The openings in buildings, such as doors, windows, &c., are termed apertures.

APSIS.—The large semicircular recess situated at the east end of churches. A large arched recess in an apartment: also the canopy of a throne.

APRON. *See* FLASHING.

APRON-PIECE.—A piece of timber used in the landings of a double-flighted staircase, fixed horizontally to bear the joists and carriage-pieces.

APRON-LINING.—The facing which covers the apron-piece.

AQUÆDUCT.—A species of canal or channel, constructed of brick or stone, for conveying water, by means of a regular descent, through an uneven country to a town or city. These are either visible or subterranean. The first serve to convey the water over valleys and plains, by means of arches supported on piers; and the second to carry it through mountains.

ARABESQUE.—Arabesques are composed figures, which have taken their origin from the hieroglyphical style of writing; and were originally figures of objects, serving as real characters; but which, by an early licence, were transmitted into architectural decoration. although their literal value was lost. It is named the *Arabesque style*, and is for the greater part composed of capricious, fantastical, and imaginary objects; represented in architecture by painting or sculpture; and employed in the decoration of walls, panels, sides of doors, faces of pilasters, friezes, and sometimes applied to the soffits of flat and cylindrical ceilings.

ARÆOSTYLE.—An intercolumniation of four diameters, taken to the face of each shaft.

ARÆOSYSTYLE.—The employment of columns in pairs, the intermediate space between them being so small, as to cause their bases and capitals nearly to touch each other.

ARC.—*See* GEOMETRY.

ARCADE.—One or more arches formed in the thickness of a wall, and supported by piers and columns. A name also given to a range of shops forming a passage from one street to another; as the Burlington and Lowther Arcades, at London.

The designs for an arcade, given in the Architectural Director, are adapted to an irregular site, on which of all others they are the most difficult to arrange. Arcades might be judiciously erected in all the principal towns; being profitable to a proprietor, by enhancing the value

of back land; and also a great accommodation to the public, by affording a convenient covered promenade.

ARC-BOUTANT. ARCH-BUTMENT. FLYING-BUTTRESS. ARCHED-BUTTRESS.—A species of arch constructed at the exterior of an edifice, to serve as an abutment to the springing-point of a vaulted roof.

ARCH.—An arrangement of bricks or stones, the beds or joints of which, tend to one or more centres; so as to support themselves and a superincumbent weight.

There are four kinds of arches in ordinary use: semicircular, scheme, elliptical, and straight arches.

The first of these arches is an exact semicircle; and has its centre in the middle of the diameter, or right line passing the feet of the arch. It is employed in circular-headed doors and windows, groins, &c. The improved method of brick groining, consists in raising the angles from an octagonal pier, in the place of one that is square. By this plan, the angles of the groins are strengthened, the band being carried round the diagonals of equal breadth; thus giving better bond to the bricks; which are on the other plan so much cut away, that instead of affording support, they are themselves supported by the adjacent filling-in arches.

A scheme arch is a segment, or any portion of a circle less than half; the height of which varies from one-fourth to one-sixth of its opening. It is used in foundations, for discharging weights over openings, and sometimes as an ornamental arch above doors and windows.

An elliptical arch is one struck from three centres, and which is surbased, or less in height than half its span. For the methods to strike an ellipsis, *See* GEOMETRY.

A straight arch, is one of which the soffit and top forms right and parallel lines; the beds or joints tending to one centre. This arch is generally employed over windows. The diminishing point, for the joints, may be the apex of an equilateral triangle; the base of which will be the soffit of the intended arch. This arch may be from four to five courses of bricks in height, according to the quality of the building. To key the arch in, it is usual, to have a brick in place of a joint, in the centre; and as this centre brick tapers a trifle more than the others, though of an equal length, attention should be paid to ease it a little; when, as is usual, they are all prepared from the same mould.

The depth of brickwork used in semicircular, scheme, and elliptical arches, depends on the size of the apertures, and quality of the building, where they are intended to be employed. Thus they may be made two bricks, a brick and a half, or, for ordinary houses, one brick deep, will be found sufficient. In arches of one brick deep or high, when the walls are only half a brick thick, there can be no necessity for joints following the course of the arch in every alternate brick. Thus, when joints are shewn in such arches, they are generally false; being merely nicks of little depth, cut with a tin saw; and are made as a kind of decoration, to produce, when pointed like the other joints, a more lively appearance. When the walls are one brick or more in thickness, it is requisite that the joints in question be real; and formed of two bricks, used as headers, for the purpose of bond.

ARCHITECT.—A person who possesses a knowledge of the principles of architecture; and who is capable of making a judicious and skilful application of those principles, in such edifices as he may design.

ARCHITECTURE, GRECIAN.—There is nothing more frequent, and at the same time more erroneous, than to suppose the existence of an architecture common to all people or nations, and of a local origin. There cannot have existed a universal architecture, from the circumstance of the wants which the inhabitants of different countries experienced, not being uniformly the same. The habitations that self-preservation led them to construct, were governed by, and hence necessarily adapted to a variety of local circumstances; differing greatly amongst the several distinct settlements of the human race. The only particular in which the various styles of architecture resemble each other, is intellectually; it is in those impressions that the qualities exhibited in the art of building, is enabled to produce on the minds of all men, from every part of the globe. Some one of these impressions may result from all the styles. Further, there are the principles of solidity, which are common to all nations, and are connected with general physical laws.

But as respects that which is understood by system, taste, style, and species of architecture; if the facts which have been produced in the present work; and if the principles which have been deduced from them are admitted to be incontestible; it therefore would be both unnecessary and useless to have recourse to the same subject, in order to endeavour to discover those relations between the forms of the various styles of architecture, which can only have been fortuitous. Architecture has had no birth-place. It has sprung from no particular country, inasmuch as it is common to every part of the globe. Neither has it proceeded from the huts of Greece, the subterrains of Egypt, the tents of Asia, nor from divers compound principles of which we are unacquainted. It must be an abuse of language to employ the word architecture thus. It is essentially requisite to state the name by which the architecture in question is distinguished. Between the general idea of architecture, and the special idea of a particular architecture, there exists the same difference, as between language and a language. Thus to direct the attention to discover a unique origin of architecture, would be as futile an employment, as to endeavour to discover a primitive language.

Hence, the points of resemblance which may be found between the Egyptian and Grecian architecture; does not destroy, in any respect, the originality of this last; because to effect this, it would be required that the similarities related to the system, to the general types and configuration, and to the physiognomy of the architecture in question. Now as respects each of these relations, there exists such a striking difference between the two systems of architecture, that a simple inspection is a sufficient proof. A portion of objects employed as embellishments, when taken from one system of architecture and applied to another, proves only that there existed between the two nations a communication and acquaintance, through the medium of commerce. This could not occur, nor continue for any duration of time, without intro-

ducing into one of the nations, the inventions and uses peculiar to the other.

Now, it is indubitable, that political and commercial communications were established at an early period, between Egypt and Greece. It is in consequence beyond a doubt, that with the great number of beliefs, opinions, and institutions, which had been introduced from the former into the latter country, the Greeks, the most imitative race that ever existed, had likewise received some suggestions from the decorative details of the architecture of the former people.

Although the Grecian temples present an original character in the special forms of their architecture, yet it would be difficult to affirm that in their plans and general dispositions, that the Greeks have not been influenced by an imitation of the Egyptian customs.

From all the plausible points of resemblance, which would by a judicious critique be acknowledged to exist between these two systems of architecture, the Egyptian taste never seems to have entered into the Grecian architecture; and that the points of resemblance consist in the appropriation of inconsiderable details; which were further embellished and perfected by the Greeks. In fine, the Greeks appear never to have estimated the Egyptian architecture under the relation of art; except with that indifference, that the eyes of a people exercised by a correct imitation of the beauties of nature, would naturally look upon an architecture so tasteless and monotonous.

The Grecian Architecture presents neither the licences of the Asiatic, nor the cold sameness of the Egyptian; but an expression resulting from order and harmony. This distinguishing quality is produced by the proportions, to which its most extended conceptions, as also its minutest details, are subjected by art. The proportions, by which the Greeks constituted, of architecture, a real art, were the result of a fortunate concurrence of circumstances. The carpentry of which their primitive architecture was formed, gave the first elements of its proportions; the study of the other arts, and particularly those which consist in the imitation of the human form, constituted their basis; but it was from the great area of nature, that this architecture deduced those general laws of order and harmony, by which it became enabled to produce in man such sentiments of admiration, varied impressions and effects, which rival those produced by nature.

The Greeks employed the same spirit of order and harmony in all their arts. At the time in which they determined the forms of beauty in painting and sculpture; they also instituted laws for the different kinds of poetry, scenic effects, and for the dramatic art; for the enthusiasm of the lyre, for the canto of the epic muse, as also for the art of speaking, and for the emotions of eloquence. These laws are so just, and founded in such a manner upon nature, that they have become the guides of all nations; and serve as a scale to determine the degree of advancement made in the arts by any people.

ARCHITECTURE, ROMAN.—Roman Architecture, is no other in reality than Grecian; that is to say, that the architecture of these two nations, is in effect one and the same; for reasons which are shewn in various parts of the present work, of its having propagated itself, wherever the

Greeks penetrated; and wherever their genius, more powerful than their arms, extended its influence. From communications much more ancient than are imagined, the Greeks had, from the highest antiquity, carried into Italy the seeds of the language, religion, worship, customs, arts, and opinions of Greece. Numerous Grecian colonies had established themselves upon the shores of the Italian peninsula; and built cities in the interior of these territories, a long time before the birth of the supposed founder of Rome. Whatever may have been the origin of this city, or to whatever century it may be traced by historians, far from their discovering the first steps of a civilization in its infancy, they discover, on the contrary, a people already enriched with the knowledge and the arts of its neighbours. Now all its neighbours, whosoever they may have been, whether natives of the country itself, or descendants of foreign colonies, and of the arrivals from Greece have had, with very trifling differences, their language, customs, arts, and architecture, in intimate relation with those in Greece. Rome then never possessed any other architecture, than that of Greece. Thus there is not, correctly speaking, a Roman architecture; if by it is meant one that is original.

By the early communications before mentioned that existed between Etruria and Greece, there was introduced, at a remote period, into the superior regions of Italy, the language, writing, religion, mythology, and images of Greece. It has been shewn in treating of the Tuscan order, that all the information which has descended to us, descriptive of the Etruscan architecture, testifies an identity of system, on all points, with that of the Greeks. History further informs us, that Rome, from its origin, and in the construction of its earliest works, adopted the taste of the Etruscans; and also employed the skill of their artists in their execution. Rome, as will be shewn, afterwards possessed a considerable number of native architects; an advantage not afforded to the other arts. Architecture is more immediately connected with the interests of a nation, as regards its politics, manners, and religion, than is generally conceived. When considered under this triple point of view, it need not excite our astonishment, that it was cultivated at Rome with a kind of predilection, from the earliest ages. Numerous remains which take their date from that period, together with the testimony of historians, prove the injustice of regarding the early Romans as barbarians, or as being unacquainted with architecture.

In proof of the above remarks may be cited, the circus, situated between the hills Palatinus and Aventinus, commenced by Tarquinius Priscus, and surrounded by a covered portico by Tarquinius Superbus. At the same time the great cloaca was in progress. Tarquin the elder added to the Forum, Vetus or Latinum, all that could contribute to its utility and embellishment. He constructed the walls of Rome, and commenced the erection of the Temple of Jupiter Capitolinus; which presented the architectural system of Greece, continued by Servius Tullius and Tarquinius Superbus. Its interior was distributed in such a manner as to present a naos having an aisle on each of its two sides; and at the exterior its peristyle, consisting of three ranges of columns, was surmounted with a pediment. These statements which are corroborated by the testimony of the historians, Titus Livius, Dionysius Hali-

carnassus, and Tacitus. The beauty of the above mentioned temple, is spoken of by the last of these writers in the strongest terms of admiration; and may serve to convey an idea of the taste of the Romans in architecture, from the earliest period.

Such was the state of architecture, under the reign of kings who founded this empire, as also under that of the republic which extended it. Utility was exhibited in their design, and greatness and solidity in their construction. Such also was the degree of propriety observed in the application of the resources of the art at this epoch, that all its magnificence, the employment of which was prohibited from being used for individual purposes, was reserved for temples and other public edifices only.

If architecture, according to Vitruvius, should present in its productions, utility, solidity, and beauty; the architecture at Rome of the above mentioned period, evidently fulfils the first two conditions. As to the third, notwithstanding that the idea of beauty may be applied to that which presents simplicity of construction; and likewise, that greatness and solidity also form a part of that which constitutes beauty in architecture; yet Vitruvius must necessarily have understood by its application in this instance, that species of beauty, which is produced by delicate display of forms, harmony of proportions, elegance of members, and all that relates to ornament or decoration.

This kind of beauty, thus understood, as the idea of necessity and utility alone would not produce it; and as it appertains to the perfecting of a moral sentiment, which, to develope itself in architecture, requires the aid and inspiration of the other arts; all tend to prove, that this complement of the three principal qualities of architecture, was reserved for a posterior period; and that this beauty which is the perfection of art, or rather art itself; waited but at Rome for more favourable times and circumstances.

Architecture doubtless requires, that the aid which it receives from painting and sculpture, be in harmony with it; both as regards the sentiment of proportions, and the elegance of ornaments. Now, this was produced at the conquest of Greece, by introducing and encouraging in Rome, both the works of Grecian art, and also the ablest artists of that country. From this it is evident, that the sources for the further advancement of this art, which Greece lost by its impoverishment, Rome gained by being enriched with all the necessary means. Already were the edifices at Rome laid out on a much more extensive scale, than what was practicable in the small separated states of Greece. Architecture at Rome, being seconded by immense riches, both public and private, found a more extended scope for its conceptions, greater variety of subjects for composition, and a less limited employment of its resources.

Many remains which take their date from the reign of Augustus, are existing proofs. Of this period is the celebrated edifice named the Pantheon; which is the fragment of an immense total, that was designated the Thermæ Agrippa; and was the work of a single individual, Thus to appreciate the architectural taste of this epoch, it would be necessary that the above mentioned remains, which at the present day

are the wonder of modern Rome, be examined, with all the precious fragments of which time and barbarism have robbed it; such as the bronze ornaments of its pediment and peristyle, the golden rosettes of its cupola, the sculpture with which it was decorated, &c.; who can for an instant doubt, that the remains of such an edifice, spared by chance amongst so many others, would not have increased the celebrity even of one of the greatest cities of Greece. Rome became the capital of the then known world, and the depôt of its riches; hereby offering an immense theatre to architecture. This imperial city contained, within its own jurisdiction, all the means that could conduce to the perfection of this art. The wealth of some private individuals equalled and even surpassed the ordinary revenue of princes. Their religious zeal was expressed in the erection of temples; to what remained of the political institutions of the republic, were added those expressive of the magnificence and power of the monarchy. Military fame and the successes of war, created monuments, which together with the theatres, circusses, and amphitheatres, constructed so as to contain an immense multitude of spectators, afforded architecture unparalleled opportunities to increase its means and conceptions.

Rome witnessed the erection of monuments and edifices, that were unknown in Greece; such as triumphal arches and columns; Thermæ, which in their extent resembled small towns; the Septizonium Severi, mausolea, immense porticoes, amphitheatres, naumachiæ, &c. In these the marbles of all the known quarries were employed and others discovered, which were wrought by the chisel of the ablest artists, and to the designs of the most celebrated architects.

With such means, architecture must necessarily rise at Rome; as it did in reality, to such a state of perfection, as it never had been previously brought to by any nation; and, to which it is probable, it will never again arrive in any future ages. Witness the wonderful remains that still exist; and of which it may be remarked, that never were such a multiplicity of causes of destruction united against any other empire; never so many sieges, pillages, and irruptions; nor ever were there so many political and religious revolutions. The contemplative mind finds its admiration divided between their beauty and magnificence, and the wonderful quality that has served to prevent their entire annhilation. Thus, still surviving itself in its remains, Rome must inevitably remain the school, where all Europe will investigate its ruins. They will revive, and propagate over the entire world, that architectural system which was brought to so eminent a degree of perfection at Rome, by the united talent of Greece, and the wealth of the universe.

Nevertheless it may be remarked in favour of the Romans, that architecture was from the earliest age, their favourite art. At a period when there was scarcely the name of a single Roman statuary known, nor more than two or three painters cited by Pliny; Vitruvius tells us, that long previous to his time, Rome possessed many a celebrated native architect. He himself has transmitted to us, the names of Fussitius, Terentius Varro, Publius Septimius, Cossutius, and C. Mutius; who had severally written on this art. Without this

digression of Vitruvius, in his Preface, we should have been ignorant, that anterior to the century of Augustus, which is the time at which it is customary to date the most perfect state of this art; more than one treatise on architecture had been composed. Terentius Varro was the author of one, P. Septimius of two, and Fussitius had written on this art with the greatest success. Vitruvius again greatly regrets the loss of the writings of Cossutius on architecture, and still more those of C. Mutius, a man of great judgment, and who had completed the temple to Honour and Virtue. It is well known, that theoretical writings on any subject never precede experience. An art must have made great progress, before the necessity be felt of fixing its rules, or describing its different productions. Vitruvius also informs us, that, in the centuries preceding his own, Rome possessed great architects; and that at his time there were a considerable number.

At the time that the conquest of Greece, and the fame of Augustus, had drawn to Rome the Grecian architects; these artists did not consider themselves in a foreign country. They there found the same style of art that they had exercised in their own; the same practices, and the same system of ordonnance and of proportion. Time and experience had progressively made improvements in columns and profiles, in Greece. The Doric was losing a portion of its primitive austerity; and the increasing number of their edifices, the diversity of their character, some requiring elegance and others richness; led to a more frequent employment of the other orders, than had hitherto been exercised; which at the same time must have contributed to increase the height of the Doric, and to diminish the severity of its forms and profiles. Thus we find, from examples of this order, as employed in some of the latter productions at Athens; that they had, at that period, forsaken the continued employment of the short and massive proportions manifested in their earlier edifices. The fall of that country prevented its possessing more models of perfection in this art; whilst the skill of its most celebrated artists was employed in the edifices of the Augustan age, which were produced by the united talent of Greece and Rome; and the wealth and splendor of the state.

No city ever approached in greatness and magnificence to Rome. The greatness of states is judged by that of their capital; and reciprocally, the extent and sumptuosity of each capital, is necessarily in proportion to the poputilaon, wealth, and power of a nation. Now, what capital, even of the greatest states, can approach to that which had for provinces the most extensive kingdoms; and for its empire the known world. Rome, the unique phenomena in the history of the universe, possessed all the sources of wealth and talent necessary to accomplish the greatest enterprises; as also monuments and edifices whose completion required the most immense resources, and all the means that can immortalize the works of man.

Thus the most indubitable testimony of the power of ancient Rome, exists in its remains. A great number of the most considerable cities of antiquity, have disappeared from the surface of their sites; so as almost to defy the research of Antiquarians to discover any trace that may serve as an indication of them. Rome has still preserved some remains of its

monuments, which rise majestically above all modern constructions. Lastly, the means adopted for their preservation, will procure to these remains renewed life and fame. They have become the centre of the arts, and above all of architecture. It was this indestructible focus, whose brilliancy was restored by the enlightened zeal and talents of patrons, connoisseurs, and artists; which has diffused that light, that has propagated a knowledge of the perfection of Grecian architecture. Such is the solidity of the remains of these edifices, such their number, beauty, and diversity of kinds; that, as they have been since the restoration of the arts, so will they continue to be, the grand school of the art and science of architecture amongst all enlightened nations, and in all ages.

It does not follow because certain remains in Greece, which have escaped the destructive hand of barbarism, from their presenting, above all in the Doric order, a more original character and greater simplicity, that they can be regarded as examples, the imitation of which is adapted to modern wants. There is also a greater number of temples preserved in Greece; but these admirable monuments are rather to us, abstract models of beauty in architecture, than usual or practicable examples whose application is convenient or consistent with the different degrees of suitableness which the character and destination of modern edifices require. Antique Rome, on the contrary, contains in its remains, the fragments of almost all the edifices that it is possible to enumerate. It offers examples of the employment of all kinds of materials, adapted to all sorts of constructions, in all the forms, and presenting all the qualities that architecture can assume.

What must have been the number, extent, and magnificence, of the temples, basilica, fora, baths, theatres, amphitheatres, palaces, and numerous other buildings and edifices of this metropolis; adapted to an immense population; as given by different historians? Indeed the descriptions handed down to us, would not be credited, if some few remains of this greatness, which have survived the annihilation of all surrounding objects, were not existing testimonies to prove the truth of their assertions. Yet the great Montaigne was impressed with such an idea of its former greatness, that its present appearance serves, says he, rather to indicate the sepulchre of ancient Rome, than its ruins; and he further observes, that the few existing remains that have, almost miraculously escaped entire annihilation, from the many incendiaries, together with the united efforts of ignorance to exterminate them, must necessarily have been the least eminent of its edifices; as the most celebrated naturally must have become the first objects for destruction. This opinion of Montaigne cannot excite surprise, when we consider that the surprising height to which the surface of the soil in some parts of modern Rome is raised, by the substance of the antique edifices, is such, that in excavating to the depth of from thirty to forty feet, sometimes the summit of a column in its vertical position presents itself, and at others, the pavement of a street.

The sight of these remains, although blackened, and their ornaments corroded, by a lapse of two thousand years, yet elevate the mind of the spectator. Some idea may be formed of the estimation in which they were held by the comprehensive understanding of Winkelmann, from

the following fragment of a letter addressed to a friend on his first examination of the few remains of the greatness of ancient Rome.—"I am unable," says he, "to convey to you any adequate idea of Rome; you are not acquainted with one hundredth part of the treasures it contains. Hitherto I believed myself in possession of the knowledge of all that was excellent in art, whereas I now discover that the extent of my former acquaintance with objects of this nature was comparatively trifling; and those who have attempted to describe these remains, have succeeded better, in displaying a total ignorance of their particular merits. In the midst of these inestimable objects, I find that I do not possess the least portion of that talent which I imagined myself to have attained, at the termination of my first studies. If you wish to become acquainted with the extent of the intellectual power of man, you must visit these remains; in them you will find manifested, the superior talent, the astonishing genius, and the exquisite beauties which characterize the productions of the Greeks."

ARCHITRAVE.—The lowest of the three parts that form an entablature; and is placed immediately upon the capitals of columns.

The form of an architrave varies according to the character of the order to which it is applied; thus the face of a Doric architrave, should be plain and even. In the best examples of Greece, it is equal in height to the frieze; whilst in those at Rome, the frieze exceeds that of the architrave. The proportion assigned to it by Vitruvius is one module, and that its soffit should be equal to the superior diameter of the column. Palladio and Vignola have followed the proportion given by Vitruvius. The architraves of the Ionic and Corinthian orders, have their surface divided into from two to four fascias; and the relative proportion between the architrave and frieze of each, is partly similar. Vitruvius gives the following rule for the proportion of Ionic architraves:—For columns from twelve to fifteen feet high, the architrave should have half a diameter in height; and dividing the architrave into four parts, three should be given for the height of the frieze. Those from fifteen to twenty feet should be divided into thirteen parts, one of which will be the height of the architrave. Divide this part into four others, and appropriate three for the height of the frieze. For those from twenty to twenty-five feet, the columns must be divided in twelve parts and a half; and one of these parts will be the height of the architrave. The frieze has the same proportion as the example last mentioned. Columns from twenty-five to thirty feet, must have their height divided into twelve parts. One of these will give the height of the architrave. The frieze has the same proportion as the preceding example. *See* Plate 25, of ARCHITECTURAL DIRECTOR. For accurate measurements of the architraves of the best examples in Greece and at Rome, the reader is referred to the comparative Tables; and to the articles treating on the Doric, Ionic, and Corinthian orders. The practical methods will be found under the heads, Doric, Ionic, Corinthian, and Entablature.

Architrave, is sometimes used to signify a number of mouldings placed horizontally and vertically round the sides of rectangular apertures; as doors and windows. The plates 37, 40 to 48, present a variety of designs for architraves, with dimensions; in order more readily to find

the proportion of their respective parts in practice. The best proportion for the breadth of architraves is, one sixth part of the width of the opening they are intended to surround.

ARCHIVE.—A place destined to keep the charters, records, &c., of a nation. The temple of Saturn was used for this purpose amongst the Romans.

ARCHIVOLT, or ARCHIVAULT.—A member situated round the curvature of an arch. It is sometimes accompanied by a key-stone, or console. As regards their details, the same remarks are applicable to them, as to those contained under the head, Architrave. *See* ARCHITRAVE.

The Plate 37, of Archivolts, presents a variety of designs, with dimensions, to facilitate their practical application.

AREA.—The space preceding any important edifice, or by which it may be surrounded. Also court yards and other openings, arranged so as to admit light to various parts of buildings. This word is sometimes used synonimous with Site and Place. For methods to find the superficial contents of areas, *See* MENSURATION.

ARENA.—An open space, situated in the centre of the antique amphitheatres.

ARITHMETIC.—The science of numbers. The various operations so useful to practical men, will be each familiarly explained in their proper place.

ARSENAL.—A magazine, for the making or keeping of arms, naval or military furniture, and equipments; as the arsenal of Woolwich.

ART.—This term may be employed to signify either the useful or mechanic, liberal or polite arts; the former requiring manual labour principally, the latter requiring the exercise of mind more than of the hand and body. As regards its application to architecture, as a fine or liberal art, it may be defined, a mixed art; the produce of necessity and pleasure; the object of which is to add to our comfort and pleasure by a combination of forms, the most suitable for our corporal necessities, and the most analagous to the affections of our senses.

ARTIFICER.—A workman; as a joiner, mason, bricklayer, &c.

ARTIST.—A term applied to a person who professes one of the fine or liberal arts; as an architect, painter, sculptor, or engraver.

ARTIZAN.—One who follows a mechanical art.

ARTISTLIKE.—That which exhibits the judgment and skill of an able artist.

ASH.—A wood very common in England, and mostly used for implements of husbandry. It soon decays when exposed to the weather; but when kept dry, it is of great duration. This wood is naturally of a spongy consistence; and that is of the best quality which has its fibres long and straight; which quality is much the same through the whole thickness of the tree, except its being rather tougher at the outside. The proper time to fell ash, is in the winter; and it may also be proper to remark, that it requires a similar process of seasoning to oak.

ASHLAR.—Is applied to walls which are faced with square stones, hewn or rubbed; and backed with rubble, stone, or brick.

The stones of an ashlar front, should have their upper and under

surface parallel with each other, and at right angles to the face. If the joints be wrought hollow, the edges will be apt to splinter under great pressure. The vertical joints may be bevelled off to the back, commencing one or two inches from the face. The stones thus having the form of a truncated wedge, will in each course offer a continuation of angular indentations within the wall. The stones are so chosen and arranged, that the upright joints, and hence the angular spaces formed by the bevelling of the upper course, fall on the middle of each stone in the course immediately below. By this plan, the ashlar is bonded to the brick, rubble, or rough stone of the back; and the wall itself is stronger than when the stones are wrought square. A further increase of strength may be given to an ashlar wall, by making such a choice and arrangement of the stones, that in every alternate course they may extend farther in the wall, than those next above and below. Bond stones, which ought frequently to be introduced in ashlar work, must be square from the face to the back, and not bevelled like the other stones; and should be so placed in each course as to be in the centre of the space between the two bond-stones, placed in the courses immediately above and below.

ASPECT.—A term sometimes used to signify the position in which the different parts of a building or edifice may be situated; and at others to express the beauty of its appearance.

Vitruvius, treating on this subject, as understood in the former sense, makes the following observations:—"The winter dining-room and the bath, should be situated opposite to the winter's declining sun; because its light is there useful. Besides, the western sun shining thereon, produces heat; and makes the aspect warm and pleasant in the evening. Bed-chambers and libraries should face the east; for in these the morning sun is required. It is also necessary, in order that the books in libraries may not decay; for in those that are situated to the south and west, they will be damaged by the damps and worms, which the humid winds generate and nourish. The rooms destined to be employed during spring and autumn, should face the east; for the windows being then turned from the sun, proceeding westward, renders those apartments temperate at the time they are generally employed. The summer dining-room should be situated towards the north, because this aspect is not, like the others, rendered hot at the summer solstice, for being turned from the course of the sun, it remains always cool; and when used, is salubrious and pleasant. The same aspect is also the most proper for picture rooms or galleries; on account of the equality of the light."

As regards the best aspects, for the principal fronts of buildings in our own country, that of the south-east is the most esteemed; and the south, and due east, rank as being the next best. Again, the south-west is regarded as the most objectionable, on account of rain coming more from that point, than from any other. An aspect due north, or west, have also a disadvantage; the former from being deprived of the sun; and the latter from being incommoded with it, during a considerable portion of the day.

ASPHALTUM.—In painting. A solid bituminous substance, of a

deep shining black, or brown colour within; with scarcely any smell ti it is heated; when it emits a strong pitchy odour. It is plentiful in several parts of Egypt, and on the surface of the Dead Sea. From France, Germany, and Switzerland, a similar bitumen is procured; differing only in its smell, which is more pitchy. Sometimes pitch itself, and the residuum after the distillation of amber, are both substituted for it; but are easily distinguishable from the natural bitumen. *See* BITUMEN.

ASTRAGAL.—Is a name given to a small semi-circular moulding and a fillet, commonly situated at the upper extremity of the shafts of columns; sometimes plain, and at others sculptured in berries.

ATHENIAN ARCHITECTURE.—A term sometimes used to signify the antique architecture of Athens. *See* ARCHITECTURE.

ATLANTES.—A name given to a species of male statues, serving the place of columns. These are also known by the name of Telamones. Which *see;* as also, PERSIAN, and CARYATIDE.

ATRIUM.—A part in the houses and palaces of the Romans, that was situated at the principal entrance; having, in the Corinthian atrium, a covered area in its centre, named Cavædium; which was surrounded by numerous columns. The apartments necessary to the service, were distributed around the atrium. As this was a part much frequented, it generally displayed great magnificence. The lower part of the walls was incrusted with marble; while the upper presented graceful arabesques, forming compartments, in which were executed different compositions in painting. The cavædium, although covered, had in the middle an open space, which served to admit light, and was named compluvium; through which the water from its roof was conducted to a square basin, placed in the centre of the area; and from this it was conveyed into cisterns. From this basin there sometimes issued a *jet d'eau.*

The atrium is often confounded with the vestibule; but the real vestibule was the area or court-yard which preceded the principal entrance, and which was generally surrounded by a colonnade, and planted with trees. Besides the species of atrium just described, which is called the Corinthian, there are four others, deriving their different denominations from the manner in which the cavædium was covered. The first is the Tuscan, the roof of which is simply sustained by four beams, which bisect each other at right angles. The second, named the Tetrastyle atrium, is supported by a column at each of its four angles. The third kind is the Corinthian atrium, which has been already described, and is the most magnificent. The fourth is the Displuviatum atrium, and differs from the former, inasmuch as its roof, instead of throwing the water into the centre of the compluvium, is so inclined as to convey it beyond the cavædium. The fifth species is called the Testudinatum, and is distinguished from the others by its having no opening in the centre of its roof.

ATTIC.—A term occasionally used to signify any architectural object peculiar to Athens. It is likewise employed to denote a low story, situated above the crowning entablature of a building.

ATTIC DOOR.—A door having its jambs so inclined, as to render its opening less under the lintel than at the foot.

ATTIC BASE.—The most suitable base for the Ionic order. *See*

pl. 10, of ARCHITECTURAL DIRECTOR. Also often applied to the Corinthian. Vitruvius assigns the following proportions to this base:—"Divide the total, which is one module, into three parts, taking one for the height of the plinth. The remaining two parts must be subdivided into four; one of which must be given to the superior torus. The other three parts must be again divided into two; one of which must be given to the scotia, and the two fillets; and the last to the lower torus.

ATTIC ORDER.—A species of short pilaster peculiar to attic stories. The height of this pilaster varies from one-half to one-third of that of the order below; from a fifth to one-sixth of this height, is taken for its diameter. The usual decoration of its capital, presents a mixture of those of the Ionic and Corinthian; and it should be regulated by the character of the ordonnance to which it is intended to be applied.—*See* FRONTISPIECE.

The windows employed in attics should be square, or otherwise not present any very striking difference between their height and width. *See* pl. 69.

ATTRIBUTES.—Are symbols, the judicious employment of which, materially contributes to characterize architectural productions. *See* DECORATION, DESIGN, &c.

AUDITORIUM.—A place amongst the ancients, in which poets and orators recited their productions.

The auditorium of the judges was situated in Cæsar's palace; and was used for the immediate dispensation of justice, in unimportant cases.

AURUM MUSIVUM.—One of the richest mixtures used for varnished works; producing an appearance resembling gold in powder. The following are its component parts:—To three parts of mercury put twelve parts of the purest tin; to which must be added three parts of sal ammoniac, and seven parts of flower of sulphur; which mix in a stone mortar, and afterwards raise to a gentle sand-heat in a matrass. This heat must be continued until it has ceased to emit any white vapours, when it should be increased a trifling degree by cinnabar sublimes, with a portion of oxygenated muriate of tin; at which time the sulphur unites with the remaining tin, and presents a rich golden matter, which is the aurum musivum.

AVIARY.—A place in which different species of living birds are reared. The composition of an aviary should be marked by lightness and elegance of form. Its situation, which should be neither cold nor humid, ought to abound in verdure, forming a sufficient shade. Water, when it is judiciously introduced, is desirable, and indeed indispensable, when the aviary is intended to contain birds of the aquatic species; but it is essential that it be so arranged, that the water may continue in a pure state.

AXIOM.—In Geometry, is a proposition or assertion, of which the truth is at first sight so evident, that no proof or demonstration can make it more manifest. Such as, that two things each equal to a third, must be equal to one another:—that the whole of any thing is greater than any part of it:—that the whole of any thing is equal to the sum of all its component parts:—that two bodies which precisely coincide with each other, or which precisely fill the same space, are equal the one to the other, &c.

AUTHORITY.—A particular employment of the objects which enter into an architectural design; and which has for its precedent an example amongst the productions of some celebrated architect; or otherwise in edifices erected by certain artists in some particular century or epoch, that may be more or less esteemed amongst the enlightened part of mankind for the correct taste which their works, during this period, exhibited. *See* ARCHITECTURE.

AXIS.—In mechanics, a certain line about which a body turns.

AXIS.—In Geometry, the straight line in a plane figure, round which it revolves to generate a solid.

Axis, is commonly employed to signify a supposed right line drawn from the centre of one end to that of the other of any figure.

Axis of a circle or sphere, is a right line passing through the centre, and touching the circumference at each side.

Axis of a cone, is a right line passing through the centre of its base to its vertex.

Axis of a curve line, is sometimes used to signify a diameter, which has its ordinates at right angles to it.

Axis of a cylinder, is a right line extending to the centre of each end.

Axis minor, conjugate, or second axis, of an hyperbola and ellipse, is a straight line drawn through the centre, perpendicularly to the axis major, or transverse axis.

Axis major or transverse axis, in the ellipse and hyperbola, is the diameter passing through the two foci, and the two principal vertices of the figure. This axis forms the longest diameter of the ellipse, but in the hyperbola it is the shortest.

B.

BACK OF A HIP.—The upper edge of a rafter, situated between the two sides of a hipped roof, which is formed to an angle, in a line with the rafters on each side.

BACK OF A SLATE.—Its upper side.

BACKER.—A narrow slate laid on the back of another that is broader and square-headed, where the slates commence to be narrower.

BALCONY.—A projection situated at the foot of windows in the front of buildings; generally supported by consoles, and surrounded by a balustrade of stone, or by an iron railing.

BALUSTER.—An ornamental object resembling a small column; and composed of a base, shaft, and capital. For their form and proportion, *see* pl. 50, fig. 5 and 6.

BALUSTRADE.—A range of balusters placed upon a plinth, and surmounted by a cornice.

A balustrade is best situated when placed between the sides of the apertures of arcades above the ground story, or between the pedestals of a range of columns forming a gallery; in balconies, staircases of important edifices, enclosures for altars, thrones, and state beds; and not upon the entablature of buildings or edifices, except when their roof is constructed in the form of a terrace.

BAND.—A flat member or facia, that has little projection.

BASE.—The lowest part or member, serving as a support, and projecting beyond the superincumbent body. Particularly applied to the lower member of a column and a pedestal. For their form and proportions, *see* the Plates and Tables of the various orders.

BASEMENT.—The inferior part, or the lower story in a building; sometimes decorated with rustics, at other times left plain; and serving as a pedestal or base to the upper portion of the structure. *See* pl. 77.

BASILICA.—The antique edifices that class next in importance to the temples are the basilicas. These were extensive edifices, situated contiguously to every forum, in which the magistrates presided to administer justice. According to the ancient plan of Rome, the existing remains, and the descriptions given by Vitruvius, they were composed in their interior, of a principal nave and two side aisles, formed by two ranges of insulated columns, which were continued round the third side; and the opposite extremity presented a large semi-circular niche, occupied by the tribunal. The first range of columns supported a gallery; at the front of which was a plain continued balustrade, that served as a stylolate to a second range of columns, intended to support a portion of the roof of these extensive interiors; and the whole exhibited a great degree of majesty and beauty.

Windows were situated on each side of the galleries for the admission of light, which was likewise admitted in the same manner under the galleries, or otherwise by means of intercolumniations.

The observations made by Vitruvius as regards basilicas are, that the general proportion of the breadth of their interior should not be less than one-third of their length, nor exceed one-half; except in cases where these rules cannot be adopted. When the given site presented too great a ratio of length, compared with its breadth, it was customary, in order to remedy this, to construct a chalcidicum at each extremity.

The height of the lower range of columns was equal to the breadth of the side aisles; and these to one-third of the principal nave. The columns forming the second range, having their height and diameter less than those below, were situated upon a continued pedestal, which served as balustrade. Of the fourteen basilicas that were erected at Rome, there exist no remains capable of throwing further light on this subject.

The principal difference that existed between the religious service of the ancients and that of Christianity, necessarily gave rise to the adoption of those particular distributions remarkable in the temples of the former, and the churches of the latter. Thus the ceremonies of the ancients were performed in an enclosed area, at the front of their temples; the temple itself forming but a kind of sanctuary; whilst the religious service of the Christians required spacious interiors, capable of containing those who assembled to join in the devotions. The churches were so constructed, that the officiating minister was visible to all present; and also, that each individual might distinctly hear those public discourses which formed a part of the service.

Of all the edifices employed at this time, none presented a total so capable of meeting all the exigences of the then newly established religion, as the basilica. Hence the principal reason of their adoption.

BASS-RELIEF.—There are three kinds of relief, by which figures, executed in sculpture, are more or less detached from the ground upon which they are wrought; namely, the alto-rilievo, or bold relief; mezzo-rilievo, the medium, or half relief; and the basso-rilievo, or low relief: but each of these is often indiscriminately termed a bass-relief, or a basso-rilievo.

BASTARD STUCCO.—Three-coat plaster, but is not hand-floated; and the troweling requires less labour than troweled stucco. The first coat consists of the rendering or roughing-in; the second is floated similar to troweled stucco; and a small quantity of hair is added to the sand, in the third coat.

BATTEN.—Wood, technically named stuff; varying in thickness from half an inch to one inch and a half; and from two to seven inches in breadth.

BATTEN DOOR.—This description of door is of two kinds: it is said to be singly battened, when the battens are applied to one side only; but when applied to both sides, it is termed doubly battened. This latter manner forms a door of considerable strength, from the stiles on each side being bolted together; and presents the appearance of a framed door. Boards which are grooved and glued together, form the ground on which are nailed the stiles, munnions, and rails made of battens. This method is almost exclusively applied to gothic doors.

BATTER. BATTERING.—When the face of a wall, or of a piece of timber, inclines inwards, so that the plumb would fall within its base, the inclination is called *battering;* it is usually made about one inch in a foot.

BAY.—In the framing of a floor, the space between any two adjacent supports, is termed a bay of joisting. A bay of joisting situated next to the wall, is named a tail bay. And the space, either between two girders, or binding joists, is termed a case bay.

BAY WINDOW.—One that projects from the face of the wall; and which is generally either circular or polygonal in its plan.

BEAD.—The name of a moulding, in ordinary use in joinery; which is worked on the lower edge of facia boards and architraves; and on the upper edge of skirting boards. The panels of doors, when of the same thickness as the frame-work, are generally beaded. To do this, the panels are first fitted into the frame, and the whole worked level; it is afterwards taken to pieces, and the edges of the frame-work are worked with the bead-plane.

BEAKING-JOINT.—A joint made by the concourse of several heading joints in the same line.

BEAM.—*See* TIE-BEAM, GIRDER. When the weight which a beam will bear at its middle is found, the weight which it will bear at any other point may be found thus:—Multiply the square of half the length of the beam, by the weight it will bear at its middle. Divide the product by the rectangle, or product of the parts of the beam into which it is divided by the weight; and the quotient will be the weight which it will bear at that point.

A beam supported at both ends, will bear twice as much, when the

ends beyond the points of support are prevented from rising, as when they rest loosely on them.

A beam, when fixed only at one end, is as strong as one of equal scantling, and twice the length, which is fixed at both ends

BEAR.—A term applied to a piece of timber which has no other points of support except those at its two extremities ; it is then said to *bear* at its whole length.

BEARING.—The distance between the two nearest points of support of a piece of timber.

With respect to the timbers employed in roofing, many opinions have been formed by different architects. It seems generally agreed, that all beams of twenty feet and upwards, ought to be trussed up in one or more places. Beams should not exceed 15 feet in bearing, not purlines, and rafters 12 feet. The last dimension likewise applies to flooring joists.

BEARER.—A wall, pier, partition, or post, that stands between the two ends of a piece of timber, and hence shortens its bearing. Price, in the following scantlings, for bearing-posts, makes those of fir, of a less scantling than those of oak. Muschenbroek, in his experiments on timber, discovered that fir is able to bear compression in the direction of the length of its fibres, or to sustain in a vertical position a much greater weight than oak ; though it is far inferior to oak when the weight is suspended.

FOR SMALL BUILDINGS.			FOR LARGE BUILDINGS.		
FIR.			FIR.		
Height	8ft.	4in. square.	Height	8ft.	5in. square.
	10	5		12	8
	12	6		16	10
OAK.			OAK.		
	10	6		8	8
	12	8		12	12
	14	10		16	16

In explanation to these dimensions, Price observes :—" If it be not convenient to allow the posts in partitions to be square, which is the strongest form, in such cases, multiply the square of the side of the posts, as here given, by itself. For instance, if it be six inches square, to keep this post nearly to the same strength, find two numbers producing thirty-six inches. Suppose the partition to be four inches thick, then let the post be nine inches the other way, so that the area of its horizontal section is the same, and its strength nearly equal to the square post."

" Posts that embrace the height of two or three stories, need not have the dimensions here given ; because every floor forms a tie. Admit a post to be thirty feet high, and that in this height there are three stories, two of ten, and one of eight feet. The scantling of fir posts ten feet in height, is five inches square ; that is, twenty-five square inches, which double for the two stories ; and also include that of eight feet high, which, being four inches, gives sixteen inches square, the sum

total of which is sixty-six inches; so that such a post would be rathe more than eight inches square. On some occasions its scantling ma be reduced in each superior story."

The dimensions assigned by Price to posts of fir, are evidently insufficient. The following scantlings are adapted for bearing-posts placed at the sides of openings, in which their breadth or face is required to be less than their side; so as to offer less obstruction to the passage or to the light, than insulate posts, which are generally square. These may be employed in the generality of buildings, except such as have their floors greatly loaded.

FIR BEARING-POSTS.

Height.	Scantling.	
8 ft.	5 in. by	9 in.
10	6½	10½
12	8	12
14	9½	13½
16	11	15
18	12½	16½
20	14	18

BED.—The beds of a stone are its upper and under surface, which are generally in a horizontal position within the wall.

BED-MOULDING.—Generally applied to the mouldings placed under the corona or drip of a cornice. In joinery, the term is applied to an arrangement of four mouldings; consisting of a quarter-round, and an ogee, having a fillet or list above and another intervening.

BED OF A SLATE.—Its under side.

BEVEL.—The two planes of a stone or piece of timber, meeting in a right line, are bevel, when forming an obtuse or an acute angle.

BEVEL JOINT.—When a joint is parallel to the fibres of one piece of timber, and oblique to those of the other, it is called a bevel-joint.

BINDING-JOISTS.—The binding-joists are the chief support of the floor.

It is better to notch ceiling joists to the under side of the binding-joists, and nail them, than to mortise and chase them in; because it requires less labour, it does not weaken the binding-joists, and the ceiling stands better

BINDING-JOISTS.

Length.	FIR Scantling.	OAK Scantling
8 ft.	7 × 3½	6⅓ × 3½
10	7¾ × 3½	7 × 3½
12	8½ × 3½	7¾ × 3½
14	9½ × 3½	8½ × 3½
16	10½ × 3½	9½ × 3½

BITUMEN. *See* ASPHALTUM.—The ancients employed bitumen on some occasions, in their buildings, to unite the bricks and stones; and

Pliny informs us that statues were preserved from the injuries of the air, by coating them with that substance.

Bitumen is met with in large masses in the departments of the Bas-Rhin, Puy-de-Dome, and Ain. The Park-mine, near Seyssel, in the last-mentioned department, affords the most abundant supply.

Bitumen may be employed in a solid, glutinous, or liquid state; and for some purposes may form various combinations with fat substances.

It is well known, how difficult it is to preserve apartments on the ground floor from damp; especially when the walls contain saltpetre. It has, however, been effected by covering those walls with two coats of bitumen. This covering was applied on a considerable surface several years since, has lasted perfectly, and every where has prevented the damp from penetrating.

In like manner it has been used on the outside of plastered chimneys, and on the plastered part of roofs; which have been thus preserved from the rapid dilapidation they commonly experience. Busts and statues, in plaster, have been preserved by the same means, though applied some years since.

Pipes and plates of sheet or cast iron, exposed to the action of the weather for six years, have been preserved from rust after having received two coats of bitumen.

Bitumen has likewise been employed for fixing the balustrades of stair-cases, instead of lead; for cementing squared stones, forming water-troughs, or cisterns; tresselated pavements, a kind of mosaic work, &c. A cistern which was composed of five plates, was covered inside and out with a coat of bitumen; it held water perfectly, and was none the worse for being in constant use for several years.

BOND.—In masonry, are the stones which run through the thickness of a wall, in order to bind it, and are called *bond stones;* in some parts of the country they are named *through stones. See* Ashlar.

Bond.—In bricklaying the term *bond* is applied to any disposition of the bricks, by which the continuity, in a straight line, of the joints of a wall is interrupted.

A bond may be adopted, which will interrupt the rectilinear direction of both the horizontal and vertical joints of a wall; but in the two kinds of bond which have hitherto prevailed, the horizontal joints are continued in the same line round the whole building, and the vertical ones only interrupted. When the wall is only intended to be half a brick, or four inches and a half in thickness, the whole of the bricks are laid so as to form stretchers; that is, their length is laid in the direction of the length of the wall, and the bond consists only in making the vertical joints in every course exactly opposite the middle of the bricks immediately above and below. But when the wall is intended to be the length of a brick or more in thickness, it would be apt to split into parts, if it consisted only of two or more walls separately bonded, as in the instance just mentioned of the half brick wall. The bricks, therefore, in thick walls, must be connected in their breadth as well as in their length, and this is done according to two principal methods, one of which is called English, and the other the Flemish bond. English bond consists of headers and stretchers crossing each

other in separate horizontal courses. In Flemish bond, the headers and stretchers are placed alternately in the same horizontal course. Flemish bond is now so common, that scarcely any other kind is to be seen. Its appearance gains it the preference over the English, though the latter is stronger and easier to execute. Many unsuccessful attempts have been made to unite Flemish facings with complete bond. Thin slips of iron, placed at equal distances, have been worked in the horizontal joints between the two courses; and again, diagonal courses of bricks have been laid in the core of thick walls, so as to cross each other at right angles in successive courses. Though the bricks in the middle of the course have a strong bond, yet as they form triangular interstices with the bricks on each side, the bond of the whole is very incomplete. As the adjustment of the bricks in the uppermost course of the Flemish bond, must depend on the course next below, the view of the under course is constantly covered by the mortar, upon which the bricks of the succeeding course bed, rendering it perplexing to the workmen, at all times, to remember their arrangement. Hence the joints are frequently made to correspond, which make the bond imperfect. In the English bond, the face of the bricks in the last course, points out the proper disposition of the bricks intended to form the course next above. For further remarks, *See* WALL.

BOND OF A SLATE. LAP OF A SLATE.—The space from the nail of the under slate, to the tail or bottom of the upper.

BOND-TIMBER.—Pieces of timber which are built in walls to connect and strengthen them. It is usual to insert a line of bond-timber in the middle of a story, of a greater strength than that placed opposite to surbases, bases, and other horizontal mouldings. As the walls in which bond-timbers are introduced, are apt to warp or even fall in case of fire, the use of them should be avoided in strong well-built walls.

A patent has within a few years been taken out, for a vertical bond, which is intended to supersede the use of the bond-timbers introduced to secure the equal settlement of the wall. In case of fire, when the bond-timbers of a house are consumed, the falling of the wall almost necessarily follows. The patentees, therefore, instead of these timbers, place rows of hard strong bricks perpendicularly in the middle of their walls, at short distances from each other in height, as well as horizontal measurement; and they place each row of the perpendicular bricks in such a manner, as to be opposite the middle of the space between the row standing in the same position immediately above or below it. Its application is intended for stone walls, as well as for those of brick.

BOTTOM RAIL.—The lower rail of a door.

BRACE.—An inclined piece of timber, disposed in pairs, and placed in opposite directions, in roofs and truss partitions; and which serves to render their framing immoveable. When a brace is used to support a rafter, it is then termed a strut.

BREAKING JOINT.—In joinery, signifies the preventing of the union of two joints.

BREAKING DOWN OR CUT.—The longitudinal division or sawing of a baulk, into boards or planks. When the saw-way is through the thickness of a plank, it is then termed a ripping cut.

BREASTSUMMER, BRESSUMMER. — A beam, longitudinally placed in an exterior wall; and employed to support a portion of its superincumbent weight over an aperture.

BRICK.—Bricks, like most other useful articles in this country, are subject to a duty; and form an important part of the annual revenue of the government. By the 17 Geo. III. cap. 42, all bricks made for sale, shall, when burned, be not less than eight and a half inches long, four wide, and two and a half thick; and by 43 Geo. III. cap. 69, which consolidated the excise duties, every thousand bricks made in Great Britain, not exceeding ten inches long, three inches thick, and five inches wide, are liable to a duty of five shillings; and when exceeding these dimensions, ten shillings.

The principal bricks used in the United Kingdom, are stock and place bricks, from the stock-brick clamp. Marl stocks, cutters, seconds, and pavers, from the marl clamp. And, red stocks, paving bricks, fire bricks, and foot, and ten inch tiles, from strong clay, burned in a kiln. The best fire bricks are from Windsor, Wales, Stourbridge, and the different iron countries.

Marls are smooth yellow-coloured bricks, and are superior, not only in appearance, but also in durability, to the stocks. The best kind of marl and red bricks, are called cutting bricks; and are used in the construction of arches over doors and windows; as also in the quoins of buildings, for which purposes they are gauged to a height, and rubbed to a centre.

Brick-moulds are ten inches in length, and three in breadth; and bricks when burnt, usually measure nine inches long, four and a half broad, and two and a half thick.

The excellency of bricks, depends on the quality and working or tempering of the earth from which they are moulded, and on the burning of them. The proper drying of bricks before they are burned, prevents cracking and crumbling in their burning. In burning bricks, the heat applied should be gradual, increasing as they become harder. If these different operations were duly attended to, there would not be so great a quantity of place, or partially burned bricks; which is generally the result of negligence, and they ought never to be employed in any permanent building. These place-bricks are often used in inside walls, and from being naturally soft, are subject to rapid decay; besides being acted upon by every change in the weather. The wall itself imbibing moisture, which discolours the plastering, produces the decay of the plates and bond-timbers. Walls in which this kind of bricks is used, not having a solidity equal to those employed at the exterior, the inequality in strength produces a bad effect on the bearing-timbers that rest on the two walls.

The dampness, arising from inside walls constructed of place-bricks, has been endeavoured to be obviated, by leaving a space between the brickwork and plastering, which is termed battening. But as these bricks engender mould, which is doubtless the secondary cause of dry rot, the cause being in the bricks themselves; and the effects of which are soon visible in the wood employed in battening.

The numerous improvements which have been made, are more

generally confined to the formation of bricks, than to the materials of which they are composed. The patent for one of the most important of these improvements has recently expired. The name of the patentee is Cartwright. His improvement consists in giving bricks such a form, that they shall mutually lock or cramp each other. The principle may be comprehended by supposing the upper and lower beds of a common brick, to have a groove down the middle, rather more than half the breadth of the brick; this leaves a shoulder at each side of the groove, each of which will be equal to one-fourth of the bed of the brick, and to one-half of the groove. A course of these bricks being laid shoulder to shoulder, will form an indented line of nearly equal divisions; the grooves being made a trifle wider than two of the shoulders, to allow for a small body of mortar. In laying the next course, the shoulders of the bricks that compose it will fall in the grooves of the first course, and the shoulders of the first course will fit into the grooves of the second, and the same with all the other courses. This principle may be applied to many forms, the main point consists in their binding each other; and the principal recommendation of the form just described, is its simplicity. It is not absolutely necessary that the bricks used in the angles of walls, should correspond in shape to each angle; as the grooves in the bricks of each wall, where they cross or meet each other, may be levelled, and the bricks lap over as in the ordinary method. To break the joints in the thickness of a wall, bricks of an increased length, though of the same breadth, will be required. Brickwork on this principle requires no bond-timber; one general bond running through and connecting the whole together; and the walls cannot either crack or bulge out, without first breaking the bricks themselves.

When bricks of this form are employed in the construction of arches, the sides of the grooves and the shoulders should be the radii of the circle of which the intended arch is to be a segment. In forming an arch, the bricks must be coursed across the centre on which the arch is turned, and the grooved side of the bricks must face the workman. It may be advisable, though not indispensably necessary, in laying the first two or three courses at least, to commence at the crown and work downwards. The bricks may be either laid in mortar, or dry; and the interstices afterwards filled and wedged up, by pouring in lime putty, plaster of Paris, grouting, or any other suitable material. It is stated, that arches on this principle, having no lateral pressure, can neither expand at the foot, nor spring at the crown; consequently they want no abutments, requiring only perpendicular walls to rest upon. They want no incumbent weight upon the crown, to prevent their springing up. Another of the advantages enumerated is, that the centres may be struck immediately; so that the same centre, which in no instance requires to be many feet in width, whatever may be the breadth of the arch, may be regularly shifted as the work advances. But the greatest advantage consists in the security it offers, and that at an economical rate, against the possibility of fire; for, from this arch requiring no abutments, it may be laid upon, or let into, ordinary walls, no stronger than what are required for timbers; of which, superseding the use, it saves the expense.

Seat-coal, or that fossil which lies between coal and the rock, will, when mixed with a due portion of clay, produce a kind of bricks, that will resist the action of fire. It has been further discovered, that seat-coal, suitably prepared, answers all the purposes of tarras, in constructions under water.

A great loss in time and materials is caused by workmen having to reduce the size of bricks to suit different parts. This inconvenience is greatly obviated by bricks now made, which in their soft state were nearly cut through by pressing a wire upon them; so that when used, they can be divided, if required, by a single blow. A small portion of these, mixed with the ordinary kinds, effects a considerable saving.

BRICKWORK.—The practice in the details of building differ almost with the county. Some are produced by the local peculiarities of materials. In the south, the scaffolding for the bricklayer is at the exterior of the building; and in the north, in the interior. Without canvassing the respective merits of each custom, it may be observed, that when the scaffolding is erected in the interior of a building, it offers a saving in expense, is an additional security to the workmen, and is less obstructive and dangerous to the public.

To obtain dry walls, battening in the interior has generally been resorted to The other course often adopted to effect this, consists in laying the bricks in the middle of the walls, without mortar, from the footings to the top. Another method is, leaving a half-brick cavity in the wall, not precisely in the middle, but nearer to the inside; the bond crossing the cavity and connecting the wall at equal distances.

The effect of frost is very injurious to new brickwork. When frost is expected, the upper course of an unfinished wall, should be protected by straw or boarding, or both. At such periods in winter, as will admit of bricklaying, the mortar employed should be of a greater consistence than usual, and if a small portion of fresh powdered lime be added, it will materially hasten its setting. Immersing bricks in lime-water greatly strengthens the work, but it is not necessary that they should imbibe the same quantity of moisture in winter as in summer; but where this plan is found inconvenient, the best substitute is to sprinkle each course with water.

Mortar that has been prepared for any length of time, should, previous to its being used, be well worked.

In carrying up the walls of a building, no single portion, if they are intended to be of an equal height, should be raised beyond the other, more than the height of one scaffold, that is four or five feet; in order that they may have an equal settlement, and the bond be more complete. When it is absolutely requisite to carry up any particular part higher than the rest, each end should be sloped off, in order to furnish a better bond to the adjoining work when executed.

When a building is not intended to be insulated, either every stretcher or every alternate one, within nine inches from the face of the front wall, should be left projecting half its length, to give such a bond to the intended buildings, as will eventually prevent those disagreeable disunions of the brickwork, which injure the appearance of contiguous houses. An expert workman, having all necessary materials at

hand, will, with the aid of a labourer, lay from ten to twelve hundred bricks per day.

Brickwork is ordinarily computed on the supposition that a wall is only one brick and a half in thickness; and when it is either more or less, it must necessarily be brought to that thickness. When the height of a wall is unequal, take the different heights and add them together, and divide the sum by the number of heights taken; the quotient will give the medium height. An indiscriminate application of this method, is however liable to error, unless where the different heights are so balanced that the excess in one part may exactly make up for the deficiency in another. A chimney standing by itself, without any party wall adjoining, is measured by taking its girth for the breadth, and the height of the story for its length; but if the chimney stand against a wall it must be measured round only from wall to wall, for the breadth. Shafts of chimneys rising above the roof are girt about for the breadth; if they be only half a brick in thickness, they are reckoned as a brick; and if nine inches, as a brick and a half; as a recompense for the extra labour they require, comprehending the plastering. A deduction is made for the materials only, and not for labour, for openings; such as of a door, windows, niches, &c.; and allowances are granted to the workmen for returns or angles of walls, for feathered gables, ornaments, &c. A rod of brickwork actually contains $30\frac{1}{4}$ square yards, or $272\frac{1}{4}$ square feet; but in practice it is customary to consider the rod as containing only 272 feet. To compute the quantity of brickwork in a wall, multiply the superficial feet in it by the number of half bricks in thickness, and divide the product by three; and the quotient is the content required.

Example 1. How many rods of brickwork are in a wall 125ft. 6in. long, by 22ft. 8in. high, and $3\frac{1}{2}$ bricks thick?

```
                     ft.  in. |   ft.  in.
Length . . .         125   6  |   272   3
Height   . .          22   8  |    12
                     ________ |   ____   in.   R. yds. ft.
                    2750      |   3267)79651(24  11  4½
                      83   4  |         6534
                      11   4  |        _____
                     ________ |        14311
                    2844   8  |        13068
Half bricks  .             7  |        _____
                     ________ |   108) 1243 (11
                 3)19912   8  |         108
                     ________ |        _____
                    6637   7  |          163
                          12  |          108
                     ________ |          ___
                   79651   0  |     12)   55 (4
                              |           48
                              |           __
                              |            7
```

In the foregoing operation, by duodecimals, the length 125ft. 6in., multiplied by 22ft. 8in. give 2844ft. 8in. for the superficial content of the wall; which multiplied by 7, the half-bricks in the thickness, and the product divided by 3, the half-bricks in the standard thickness of a wall $1\frac{1}{2}$ brick, the quotient $6637\frac{7}{12}$ solid feet, gives the content of the wall in standard measure. This quantity multiplied by 12 to take in the remainder 7, and divided by 3267, the product of reducing the solid feet in a rod, $272\frac{1}{4}$ by 12, will give 24 rods: and the remainder divided by 108, the twelfth part of a foot in a square yard of 9 feet, will quote 11 yards; and the remainder divided by 12 will give $4\frac{1}{2}$ feet, making the whole solid content of the wall 24 rods, 11 yards, and $4\frac{1}{2}$ feet of brickwork.

The same operation may be performed by decimals: but the result is a little less than the truth, on account of the fraction of height lost in converting 8 inches into a decimal fraction, which cannot be done without a remainder.

Example 2. The gable of a building rises 20 feet above the square of the wall, which is 36ft. high, by 24ft. 6in. wide; and the wall $2\frac{1}{2}$ bricks in thickness. Required the quantity in the whole end of the building, and in each part. The length 36 multiplied by the height of the wall under the gable 24ft. 6in. gives 882 square feet; which multiplied by 5, the half-bricks in the thickness, and the product divided by 3, the quotient 1470 is the standard feet; and this divided by 272, the feet in a rod, neglecting the fraction, gives 5 rods, with a remainder of 110 feet; which divided by 9, the feet in a square yard, will quote 12 yards and 2 feet over; making the content of the wall below the gable, 5 rods, 12 yards, and 2 feet.

Again, the gable is a triangle of 24ft. 6in. base, by 20ft. of perpendicular: computing this by multiplying half the height of the perpendicular by the length of the base; or half of the latter by the whole of the former; or the full dimensions of each, and the product divided by 2; the result will be 1 rod, 15 yards, and 1 foot: and these two quantities added together will give 6 rods, 27 yards, and 3 feet, for the total measurement of the end wall.

Facing and gauged arches are measured by the superficial square foot; and cornices by the lineal or running foot.

The following is an abstract of that portion of the Building Act, which relates to bricklayers. All the buildings erected in London and the several parishes within the bills of mortality, are subjected to the regulations of this act; being the 14 Geo. III.

Every master bricklayer must give twenty-four hours notice to the surveyor of the district, from the first to the seventh rate, of the building to be altered or erected; but if the building is to be piled or planked, or begun with wood, it becomes the business of the carpenter to give such notice.

The footings of the walls are to have equal projections on each side: but where any adjoining building will not admit of such projection to be made on the side adjoining to such building, it is to be complied with as nearly as the case will allow, according to each of the four rates.

The timbers in each rate, as girders, beams, trimming joists, &c.,

may have as much bearing as the nature of the wall will admit, provided four inches be left between the ends of such timber, and the external surface of the wall.

EXTERNAL WALLS.

Every front, side, or end wall not being a party-wall, is termed an external wall.

External walls, and other external inclosures to the first, second, third, fourth, and fifth rates of buildings, must be of brick, stone, artificial stone, lead, copper, tin, slate, tile, or iron ; or of some or all of these materials ; except the planking, piling, &c. for the foundation, which may be of wood.

If any part of an external wall of the first and second rate is built wholly of stone, it is not to be less in thickness than as follows :— first rate, fourteen inches below the ground-floor ; second rate, nine inches above the ground floor.

Where a recess is meant to be made in an external wall, it must be arched over, in such a manner, that the arch and the back of such recess shall respectively be of the thickness of one brick in length ; hence a recess cannot be made in walls, except they exceed one brick in thickness.

No external wall of the first, second, third, and fourth rate, is ever to become a party-wall ; unless the same shall be of such height and thickness above the footing, as is required for each party-wall of its respective rate

PARTY WALLS.

Buildings of the first, second, third, and fourth rate, which are not designed by the owner thereof to have separate and distinct side walls, on such parts as may be contiguous to other buildings, must have party-walls. They are to be placed half and half on the ground of each owner, or of each building respectively ; and may be built thereon, without any notice being given to the owner of the other part, the first builder having a right so to do when building against vacant ground.

Party-walls, chimneys, and chimney shafts, hereafter to be built, must be of good sound brick or stone, or of sound bricks and stone together ; and must be coped with stone, tile, or brick.

Party-walls, or additions thereto, must be carried up thirteen inches above the roof, measured at right angles with the back of the rafter ; and twelve inches above the gutter of the highest building which gables against it. But where the height of a party-wall so carried up, exceeds the height of the blocking course or parapet, it may be made less than one foot above the gutter, for the distance of two feet six inches from the front of the blocking course or parapet.

Where dormers (a term applied to vertical windows in roofs) or other erections are fixed in any flat or roof, within four feet of any party-wall, such party-wall is to be carried up against such dormer, and must extend at least two feet wider, and to the full height of every such dormer or erection.

No recess is to be hereafter made in any party-wall of the first,

second, third, and fourth rate, except for chimney flues, girders, &c.; and for the ends of walls or piers, so as to reduce such wall in any part of it to a less thickness than is required by the act, for the highest rate of building to which such wall belongs.

No opening is to be made in any party-wall, except for communication from one stack of warehouses to another, and from one stable building to another; and the communications allowed must have wrought iron doors, and the pannels thereof are not to be less than a quarter of an inch thick; and must be fixed in stone door-cases and sills. But there may be openings for passages or ways on the ground for foot passengers, cattle, or carriages, which must be arched over throughout with brick or stone, or brick and stone together, of the thickness of a brick and a half at the least, to the first and second rates; and a brick to the third and fourth rates. And if there is any cellar or vacuity under such passage, it is to be arched over throughout in the same manner as the passage over it.

No party-wall, or party arch, or shaft of any chimney, new or old, must be cut into, except for the following purposes. If the fronts of buildings are in a line with each other, a recess may be cut, both in the fore and back front of such buildings, as may be already erected, for the purpose of inserting the end of such other external wall, which is to adjoin thereto. This recess must not be more than nine inches deep from the outward faces of such external walls, nor be cut beyond the centre of the party-wall. And for the purpose of inserting bressummers and story-posts, that are to be fixed on the ground floor, either in the front or back wall, the recess may be cut from the foundation of such new wall to the top of such bressummer, fourteen inches deep from the outward face of such wall, four inches wide in the cellar story, and two inches wide on the ground story. The same may also be done for the purpose of tailing-in stone steps, or stone landings, as for bearers of wood stairs, or for laying-in stone corbels for the support of chimney jambs, girders, beams, purlines, binding or trimming joists, or other principal timbers.

Perpendicular recesses may also be cut in any party-wall, whose thickness is not less than thirteen inches, for the purpose of inserting walls and piers therein; but they must not be wider than fifteen inches, or more than four inches deep; and no such recess is to be nearer than ten feet to any other recess. All such cuttings or recesses must be immediately made good, and effectually pinned up, with brick, stone, slate, tile, shell, or iron, bedded in mortar.

No party-wall must be cut for any of the above purposes, if the same will injure, displace, or endanger the timbers, chimneys, flues, or internal finishings of the adjoining buildings.

The footing may be cut off on the side of any party-wall, where an independent side wall is intended to be built against such party-wall.

When any buildings (inns of Court excepted) that are erected over gate-ways, or public passages, or have different rooms and floors, the property of different owners, are to be rebuilt, they must have a party-wall, with a party-arch or arches, of the thickness of a brick and a half at the least, to the first and second rate; and of one brick to the third

and fourth rate, between building and building; or between the different rooms and floors that are the property of different owners.

Inns of court are required to have party-walls only where any room or chamber communicates with each separate and distinct staircase; and are also subject to the same regulations as other party-walls.

If buildings of different rates adjoin each other, and any addition is intended to be made to the lower rate, the party-wall of such building must be such as is required for that of the higher rate adjoining.

When any party-wall is raised, it is to be made of the same thickness as the wall in the story next below the roof of the highest building adjoining; but it must not be raised at all, unless it can be done with safety to such wall and the building adjoining thereto.

Every dwelling-house built four stories high from the foundation, exclusive of rooms in the roof, must have its party-wall built according to the third rate, although such dwelling-house may be of the fourth rate. Every dwelling-house, also, exceeding four stories in height, from the foundations, exclusive of the rooms in the roof, must have its party-wall built according to the first rate, although such house may not be of the first rate.

CHIMNEYS.

No chimney is to be erected on timber, except on the piling, planking, &c. of the foundations of the building.

Chimneys may be built back to back in party-walls; but when this is done, they must not be less in thickness from the centre of such party-wall than as follows:—First rate, or adjoining thereto, must be one brick thick in the cellar story, and half a brick in all the upper stories. Second, third, and fourth rate, or adjoining thereto, must be three quarters of a brick in the cellar story, and half a brick in the upper stories. Such chimneys in party-walls of any of the four rates, as do not stand back to back, may be built as follows:—From the external face of the party-wall to the inward face of the back of the chimney, in the cellar story, one brick and a half thick; and in the upper stories, one brick thick from the hearth to twelve inches above the mantle. If such chimney is built against any other wall, the back may be half a brick thinner than above stated.

Those backs of chimneys which are not in party-walls of the second, third, and fourth rates, must be in every story one brick thick at least, from the hearth to twelve inches above the mantle. These backs may also be half a brick thinner, if such chimney be built against any other wall.

The breasts of chimneys, whether in party-walls or not, are not to be less than one brick thick in the cellar story, and half a brick thick in every other story.

All partitions between flues must not be less than half a brick thick.

Flues may be built opposite to each other in party-walls, but they must not approach nearer to the centre of such wall than two inches.

All chimney breasts next to the rooms, and chimney backs, and all flues, are to be rendered or pargeted.

Backs of chimneys, and flues in party-walls, against vacant ground,

must be lime-whited, or marked in some durable manner; and must be rendered or pargeted as soon as any other building is erected adjoining them.

No timber must be over the opening of any chimney for supporting the breast; but all chimneys must have a brick or stone arch, or iron bar, or bars.

All chimneys must have slabs or foot paces of stone, marble, tile, or iron, at least eighteen inches broad; and at least one foot longer than the opening of the chimney when finished; and such slabs or foot paces must be laid on brick or stone trimmers at least eighteen inches broad from the face of the chimney breast, except there be no room or vacuity beneath, in which case they may be bedded on the ground.

Brick funnels must not be made on the outside of the first, second, third, or fourth rate, next to any street, square, court, road, or way, so as to extend beyond the general line of the building in such situations.

No metallic funnel or other pipe, for conveying smoke or steam, is allowed to be fixed near any public street, square, court, or way, to the first, second, third, or fourth rate, and no such pipe is to be fixed on the inside of any building nearer than fourteen inches to any timber, or other combustible material.

BRICK TRIMMER.—Applied to a brick arch used in fire places; and which springs from the wooden trimmer.

BRIDGE.—The difficulty attendant on the construction of bridges, increases more than in an equal ratio with their dimensions.

Bridges differ, according to circumstances, both in their construction, and in the materials employed.

Timber or wooden bridges. When bridges of this kind are constructed over rivers that are shallow, and have but little fall, they are generally supported upon piles, which are driven into the bed of the river, at short distances from each other; or upon framed work. Over broad and rapid currents, they should be laid upon piers and abutments of stone, as distant from each other as the strength of the carpentry will allow. The carpentry should consist of a stiff framing of timber; so constructed, that it may act as one piece, and not bend or break with its own weight, or any additional load to which it may be exposed. When this frame is straight, the upper part is compressed by the weight of the whole; while the lower part is extended. Framings possessing greater strength, may be constructed by the employment of curved ribs, which should rise from the piers or abutments, similar to an ordinary arch; and which are not subjected to a longitudinal strain by extension. These segmental ribs should be connected and strengthened by diagonal braces, keys, bolts, and straps of iron.

Stone bridges. These are the most durable kind of bridges, as the antique bridges of Rome testify. The form of their arches are either semicircular, segmental, or elliptical. In constructing the foundations of abutments and piers, a coffer-dam is employed. It consists of a temporary enclosure, formed by a double range of piles and planks, which have their intervals filled with clay. The interior space is kept dry, by means of pumps, until the completion of the work within.

For the relative dimensions of arches, piers, and abutments, *See* Abutments.

Cast-iron bridges. They are composed of ribs or frames of cast-iron, connectedly adapted to each other, so as to form arches. These kind of bridges possess great strength; but are liable to be disturbed by the expansion and contraction of the metal with heat and cold.

Suspension bridges. They are formed of strong chains, hanging in the form of an inverted arch, extending from elevated points of support. From these the road-way is suspended by means of iron rods. The points of support consist of strong pillars of masonry or iron, over the summit of which the chains pass, and are secured, on the land side, to masonry or massive frames of iron sunk into the ground. The principal advantage in suspension bridges consists in their stability of equilibrium; hence, less materials are necessary in their construction, than in that of any other kind of bridge. If a suspension bridge be shaken, or thrown out of equilibrium, it returns by its weight to its proper place; but the contrary occurs in all other kinds of bridges.

BRIDGING JOISTS.—Those small timbers in a naked flooring, which are notched upon the upper side of the binding joists, and to which the flooring boards are attached.

Bridging joists ought not to be above fourteen inches apart, measured from the middle of each; nor their bearing to exceed ten or twelve feet. When employed in ground floors, they are laid upon sleepers; in which situation if proper care is not taken to drain and ventilate the under side, the joists are subject to very rapid decay. It is a good practice to strew smiths' ashes, or even common ashes, under such floors, to prevent the growth of fungi. The ashes and scoriæ from a foundry, or any ashes that contain much iron, are the best.

SCANTLINGS OF BRIDGING JOISTS.

Bearing.	Fir.			Oak		
ft.	in.		in	in.		in.
4	4	by	2	3½	by	2
6	5		2¼	4½		2¼
8	6		2½	5½		2½
10	7		2½	6¼		2½

BRING UP.—*See* Carry Up.

BUILDING ACT.—All the buildings erected in London, and in the different parishes within the bills of mortality, are subjected to the regulations of an act of parliament, of the 14 Geo. III.; for an abstract of which, *See* Brickwork, and Carpentry.

BUTMENT.—*See* Abutment.

BUTT-JOINT. ABUTTING.—The plane of this joint is at right angles to the fibres, and the fibres of the two pieces are in the same right line.

C.

CABINET.—A name applied to a small retired apartment ; as also to that part of a building which serves to contain collections of paintings, plants, animals, coins, minerals, and curiosities of every description.

CABLE.—A wreathed circular moulding. Also the staff which is left in the lower part of the flutings of the Corinthian and Composite columns.

CAISSON.—A kind of chest or case, used in the construction of bridges, of a sufficient size to contain an entire pier, which is built in it. The caisson sinks to the bed of the river as the work advances, and the sides are removed from the bottom, leaving the lower part under the pier.

CAMBER.—The roundness of the upper side of a beam, made to prevent its sinking beyond a straight line, by the continued weight it may be required to support. The convexity may be about one inch in eighteen or twenty feet.

CAMBER BEAMS.—Those beams employed in truncated roofs. Their middle is raised to a very obtuse angle, in order to throw off the rain.

CANTILEVERS.—A kind of plain mutules, placed under the soffit of cornices of great projection ; hence they are called cantilever-cornices.

CAPITAL.—The upper part of a column. *See* the different orders with the Plates and Tables in the ARCHITECTURAL DIRECTOR.

CARCASS OF A BUILDING.—A building, before the flooring boards are laid, or the walls plastered.

CARPENTRY.—The art of carpentry is chiefly directed to the support of weight or pressure.

With respect to the scantling and lengths of timber employed in carpentry, many different opinions exist.

Beams should not exceed 15 feet in bearing; and those of 20 feet and upwards ought to be trussed up in one or more places. The bearing of rafters should not be more than 10 feet, especially in roofs of a very low pitch ; the coverings of which act with a greater pressure on their rafters than those of a higher pitch.

Timber is considerably weakened by its own weight, unless it stands in a perpendicular direction ; and when a mortise is required to be cut in the side of such timber, it will retain greater strength if cut near the top, than when made at the lower part, if the tenon be driven in tight so as to fill the mortise.

As the bending of timber is governed by the weight with which it may be loaded, a beam ought not to support for any considerable time above one-third or one-fourth of the weight it will bear without fracturing. For experiment proves, that a much less weight is required to break a piece of timber, when hung to it for a considerable period, than that which would break it when first applied.

If several pieces of timber, of the same scantling and length, are laid upon each other, and supported at each end, they will possess no greater strength than when placed side by side ; or the pieces that are applied above each other. are no stronger than a single piece, whose width is that of the several pieces, and its depth that of one of these.

Hence, it is useless to cut a piece of timber longitudinally for the purpose of applying the pieces so cut one above another; for these pieces are not so strong as before, even when bolted.

In making choice of timber, care should be taken to avoid knotty and cross-grained wood, such pieces not having equal strength with those which are straight in the grain; and if judgment be not exercised in selecting timber, the application of rules to determine its strength is useless. Timber in general retains some degree of moisture; hence bearing timber ought to have a moderate camber, or roundness, on the upper side, as timber will sway, even from its own weight, until divested of all moisture. It is likewise best to truss girders when they are first sawn, as in drying and shrinking the trusses become lighter. The camber in bearers or ties, should be effected either in their cutting, or otherwise in framing them; and may average about one inch in twenty feet. This is equally applicable to principle rafters; because without this precaution, timbers in general though well framed, will, from the shrinking of the timber and the weight of the covering, eventually sway.

Case bays in roofs and floors should not, if practicable, exceed twelve feet; that is, the bearing of the purlines and joists. In bridging floors, the binding or strong joists should not be above five feet apart; nor the bridging or common joists more than twelve inches. Also, in fitting down tie-beams upon the wall plates, the cocking should not be made too large, nor too near the outside of the wall-plate; for the grain of the wood being cut across in the tie-beam, the piece that remains upon its end will be apt to split off; whilst keeping it near the inside, will tend to secure it.

Double tenons should not be made for the purposes of bearing, as in binding-joists, common joists, or purlines. In the first place, they greatly weaken the part they are framed into; and in the second, it is a rare occurrence to have a draught in both tenons, that is, to draw both joints close. For the pin, in passing through both tenons, if there be a draught in each, will bend so much, that, unless it be very tough, it will break in driving, and consequently be injurious. Roofs are considerably stronger when the purlines are notched above the principal rafters, than when they are framed into the side of the principals; for when any weight is applied to the middle of the purline, according to this plan, it cannot bend, from being confined by other rafters; and should it so occur, the sides of the other rafters must necessarily bend with it; consequently it receives additional strength from the other rafters.

The strength of the timber is exerted in four different ways: in sustaining a longitudinal tension; as in tie-beams: in supporting a longitudinal compression; as in bearing-posts: in withstanding a transverse pressure; as in joists, &c.: and, in opposing the act of twisting or wrenching.

Longitudinal tension. The tension which a piece of timber can beer when pulled lengthways, depends on the cohesion of any cross section. As the material stretches out, the longitudinal attraction of the particles becomes augmented. This increase is, at first, proportional to the dilatation; but it afterwards decreases slowly, and a small additional strain is then sufficient to produce that limit of extension which occasions total fracture. Its length will not influence the greatest strain which

it can bear, this being determined entirely by the smallest cross section, where the dislocation of the particles will take place.

The following table shews the weights which were necessary to tear asunder rods of the principal kinds of wood, whose bases were each a square inch, the weights being applied in the direction of their length.

Beech, oak	17,300 lbs.
Alder	13,900
Elm	13,200
Mulberry	12,500
Willow	12,500
Ash	12,000
Plum	11,800
Elder	10,000
Fir	8,330
Pitch, pine	7,656
Cypress	6,000
Poplar	5,500
Cedar	4,880

Rondelet asserts the relative strength of oak and fir to be, when employed in longitudinal tension, as 17 is to 11.

Longitudinal compression. The compression which any piece of timber suffers is at first equal to the dilatation occasioned by an equal and opposite strain, being in both cases proportional to the modulus of elasticity. But while the incumbent weight is increased, the power of resistance likewise augments, so long as the piece withstands inflexure. After it begins to bend, a lateral disruption quickly takes place. A slender vertical prism is hence capable of supporting less weight than tension. Thus a cube of English oak was crushed by a load of 3860lbs. but a rod of an inch square, and five inches high, was fractured by a weight of 2572 lbs. It would evidently have been weaker had its length been increased. On the other hand, if the scantling of a piece be considerable in proportion to its height, it will sustain a greater pressure than its cohesive power.

According to the experiments of Rondelet, made on cubes of an inch in length, it required from 5,000 to 6,000 lbs. per square inch to crush oak; and under this pressure its length was reduced more than one-third. To crush fir, it required from 6,000 to 7,000 lbs. per square inch, and the length was reduced one-half. Hence he remarks, that the relative strength between oak and fir, when employed in a vertical position for bearing, is as 100 to 119; that is, that fir, in the situation of a vertical bearer, is one-fifth stronger than oak when employed for the same purpose.

The results of Mr. Rennie's trials are considerably lower than those of M. Rondelet; they were given as follows:—

A cubic inch of Elm was crushed by	1,284 lbs.
American pine	1,606
White deal	1,928
English oak	3,860
English oak, 4 inches long	5,147

Hence, if the cubic content of a piece of timber in inches, be multi-

plied by the weight that has been found capable of crushing a square inch of the same kind of wood, then one-fourth of the product will give the load in pounds which the piece will bear with safety. Thus, required the load that a piece of oak, six inches by four, will carry with safety.

Then, 6 × 4 = 24 inches; and, according to Rennie, a piece of oak is crushed by 3,860 lbs.; consequently $\frac{24 \times 3860}{4} = 23160$ lbs., the weight required.

In general, while the resisting mass preserves its erect form, the several sections are compressed and extended by additional weight; and their repellent particles are not only brought nearer, but multiplied. This repulsion is likewise increased by the lateral action arising from the confined ring of detrusion. The primary resistance becomes hence greatly augmented in the progress of loading the pillar.

Transverse or lateral pressure. The strength of a beam, having one end firmly inserted in a wall, or its power to resist a pressure at its opposite extremity, is compounded of the direct ratios of its breadth, and of the square of its depth, and the inverse ratio of its length. Thus, a beam having the same length and breadth as another, but twice the depth, is four times stronger; and a beam of the same depth and breadth and double the length, is only half as strong. Hence, also, a beam, whose depth is triple its width, will sustain a load three times greater. For the same reason, a square prism will have its strength inversely to its length and the cube of its thickness.

A TABLE

OF THE RELATIVE STRENGTH OF TIMBER COMPARED WITH ITS CUBIC CONTENTS.

DIMENSION OF THE PIECES.		COMPARATIVE STRENGTH.	CUBIC CONTENTS.
Breadth.	Depth.		
12 in.	12 in.	1728	144
11	13	1852	143
10	14	1960	140
9	15	2025	135
8	16	2048	128
7	17	2023	119
6	18	1944	108
5	19	1805	95
4	20	1600	80
3	21	1323	63
2	22	968	44
1	23	529	23

Thus it is shown in the above table, that in the piece which is 12 × 12, the comparative strength is 1728, and the cubid content 144; which establishes the relation between the strength and solidity, as 12 to 1. But the last piece, that is 1 × 23, the strength is 529, and the

content 23. Consequently, the first piece, which is square, will have, in comparison with its cubic content, half the strength of the latter.

In general, the resistance of a beam of any form, but of a given length, to a cross strain, will be the same as if the whole power exerted were collected in the centre of gravity of each section. Thus the strain of a triangular prism, may be conceived as concentrated in a point at one-third of the distance of the perpendicular from the vertex to the base. Such prism is, therefore, twice as strong when placed on its edge as when laid on its side. This simple fact is of some importance in the practice of carpentry. If a beam be supported horizontally at both ends, and loaded in the middle, the pressure will be equally shared between the props. The effect is the same, as if it were fixed at the middle, and each end pulled upwards by half its load. The breaking weight is consequently double that which would be required to fracture a beam of half the length, having one end fixed in a wall. Hence, this limit is inversely as the length of the beam, and directly as the breadth and the square of the depth. Thus, a piece of oak, four inches square and ten feet long, broke under the weight of 4015lbs.; and another of the same timber, eight inches square and twenty feet long, was broken by a load of 16,700 lbs. The latter being twice the thickness, would have been eight times stronger with the same length; but the length being doubled, reduced the excess to four times.

Rondelet states, that the comparative strength between fir and oak, when employed for horizontal bearing, is as 8 to 9.

Duhamel made the following experiments:—A piece of oak 9·6 inches deep, and 10·66 inches in breadth, was placed upon two supports, 24·5 inches distant; and a weight of 8198 pounds was suspended to the middle, which bent it 3·73 inches. The piece broke with 9613 pounds; but on examination, the timber was found to be faulty.

Another piece of oak, which was sound and straight grained, the depth 12·2 inches, the breadth 10·66 inches, and the bearing 24·5 feet, with a weight of 8198 pounds, bent 2·65 inches.

A third piece of oak, like the last, sound and straight grained, was tried; its depth was 13·83 inches, the breadth 12·8 inches, and the length 24·5 feet; and with a weight of 8198 pounds, it bent an inch in the middle.

The strength of wood of the same kind, is, it will be observed, extremely variable, depending on the nature of the soil, and the situation and the climate where it is grown. The following tables present the results of the experiments of Barlowe, Ebbles, Tredgold, and Buffon.

—	Specific Gravity.	Length in feet.	Breadth in inches.	Depth in inches.	Bent in the middle, in inches.	Weight suspended from the middle, in pounds.
English oak . .	·960	7	2	2	1·275	200
Adriatic oak . .	·948	7	2	2	1·55	150
Canadian oak . .	·867	7	2	2	1·07	225
Dantzic oak . .	·787	7	2	2	1·26	200
Riga fir . . .	·765	7	2	2	·912	150
Scotch fir . . .	·715	7	2	2	1·560	125
Pitch pine . . .	·712	7	2	2	1·33	150
New England fir .	·560	7	2	2	·970	150
Ash	·760	7	2	2	1·27	225
Teak	·744	7	2	2	1·276	300
Beech . . .	·688	7	2	2	1·025	150
Elm	·540	7	2	2	1·42	125

—	Length in feet.	Breadth in inches.	Depth in inches.	Weight in pounds that broke the piece.
Oak, English, young tree . . .	2	1	1	482
Norway fir, from Longsound . .	2	1	1	396
Oak, from Riga	2	1	1	357
Christiana white deal	2	1	1	343
American pine, Weymouth . .	2	1	1	329
Ash, from young tree	2·5	1	1	324
Ash	2·5	1	1	314
American white spruce	2	1	1	285
Oak, medium quality	2·5	1	1	284
Beech, medium quality	2·5	1	1	271
Oak, old ship timber	2·5	1	1	264
Mahogany, Honduras, seasoned .	2·5	1	1	255
Ash, medium quality	2·5	1	1	254
Larch, choice specimen . . .	2·5	1	1	253
Acacia, green	2·5	1	1	249
Plane tree	2·5	1	1	243
Scotch fir, English growth . .	2·5	1	1	233
Poplar (abele)	2·5	1	1	228
Larch, medium quality	2·5	1	1	223
Oak, green	2·5	1	1	219
Oak, from old tree	2	1	1	218
Memel fir	2·5	1	1	218
Sycamore	2·5	1	1	214
Alder	2·5	1	1	212
Riga fir	2·5	1	1	212

—	Length in feet.	Breadth in inches.	Depth in inches.	Weight in pounds that broke the piece.
Birch	2·5	1	1	207
Walnut, green	2·5	1	1	195
Elm, wych, green	2 5	1	1	195
Spruce fir, British growth . . .	2·5	1	1	186
Chesnut, green	2·5	1	1	180
Mahogany, Spanish, seasoned .	2·5	1	1	170
Cedar of Lebanus, dry	2·5	1	1	165
Scotch fir, English growth . .	2·5	1	1	157
Willow	2·5	1	1	146
Poplar, Lombardy	2·5	1	1	131
Larch, very young wood . . .	2·5	1	1	129
Oak, green	11·75	1	1	25812
Teak	7	1	1	820
Mar forest fir	7	1	1	360

If a piece be spliced on a divided beam, equal in depth to half the depth of the beam, the strength is greater than that of the entire beam, in the ratio of 1 to 0·54.

The following is an abstract of that portion of the building act, which relates to carpenters; and to which all buildings erected in London, and the several parishes within the bills of mortality, are subjected.

Timber partitions between building and building, erected or erecting previous to the passing of the act, may remain till one of the adjoining houses is rebuilt, or till one of the fronts, or two-thirds of the fronts which abut on such timber partition, is taken down to the bressummer, or one-pair of stairs floor, and rebuilt.

Three months' notice of the pulling down of such wooden partitions, when decayed or of insufficient thickness, is to be given by the proprietor to the owner or occupier of such a house; and if the house be empty, such notice to be stuck up on the front, or front door of it.

No timber hereafter to be laid in any party-arch, or party-wall, except for bond to the same; nor any bond timber within nine inches of the opening of a chimney, nor within five inches of the flue; nor any timber within two feet of any oven, stove, copper, still, boiler, or furnace.

The wood work of chimney breasts to be fastened to the said breast with iron wall hooks, spikes, nails, or holdfasts, which must not be driven more than three inches into the wall, nor nearer than four inches to the inside of the opening of the chimney.

No timber bearer to wooden stairs let into an old party-wall, must come nearer than eight inches and a half to the flue, nor nearer than four inches to the internal finishing of the adjoining building

No timber to be laid under any hearth to a chimney, nearer than eighteen inches to the upper surface of such hearth.

No timber must be laid nearer than eighteen inches to any door of communication, through the party-walls of warehouses and stables.

Bressummers, story-posts, and plates thereto, are only permitted in the ground story, and may stand even or fair with the outside of the wall, but must go no deeper than two inches into a party-wall; nor nearer than seven inches to the centre of a party-wall, when it is two bricks thick; nor nearer than four inches and a half, provided the party-wall does not exceed one brick and a half in thickness.

Every corner story-post must be of oak, and at least twelve inches square, when employed for the support of two fronts.

Window frames and door frames to the first, second, third, and fourth rate classes, are to be recessed in reveals, four inches at least.

Door-cases and doors to warehouses only, of the first, second, third, or fourth rate classes, may stand fair or even with the outward face of the wall.

No external decoration to be of wood, except cornices or dressings to shop windows, frontispieces to door ways of the second, third, and fourth rate classes, and covered ways or porticoes to buildings; but not to project beyond the original line of the house in any street or way. Such covered way or portico not to be covered with wood; nor such cornice, covered way, or roof of the portico, to be higher than the underside of the sill to the windows of the one pair of stairs floor. No flat gutter or roof, nor any turret, dormer, or lantern light, or other erection placed on the flat of the roof belonging to the first, second, third, fourth, and fifth rate classes, to be of wood.

No wooden water tanks, or trunks, must be higher from the ground than the tops of the windows of the ground story.

CARRY-UP.—Used by carpenters and bricklayers, synonymously with bring-up; each equally signifying build-up, when applied to a stack of chimnies, or a wall.

CARYATIDES.—*See* IONIC ORDER, in the DIRECTOR.

CASTING.—WARPING —The twisting of the surfaces of a piece of wood from their former position, arising from a partial influence of heat or moisture, inequality of texture, or by weight.

CAVETTO.—A hollow or concave moulding, being the fourth part of a circle. *See* pl. 2.

CAULICOLI.—Applied to the small volutes of the Corinthian capital; though it properly belongs only to the stems from whence they spring.

CEILING.—Ceilings are generally plastered upon laths nailed to the joists, and are set in two different ways. The best is named gauge. Common ceilings have no hair mixed in the plaster, it being the same as that used for the finishing coat for walls set for paper. The setting coat of the best ceilings, is composed of fine stuff and plaster, or putty and plaster.

CEILING-JOISTS.—Small pieces of timber fixed to the underside of the binding-joists. Ceiling-joists require to be no thicker than is necessary to nail the laths to: stuff two inches in breadth is sufficient for that purpose.

It is a better method to notch ceiling-joists to the under side of the binding-joists, and nail them, than to mortise and chase them in;

because it not only requires less labour, but preserves the strength of the binding-joists, and the ceiling stands better. Oak is not so good a material for ceiling-joists as fir, because it is more subject to warp particularly if it be not well seasoned.

CEMENT.—Calcareous cements are of three kinds: simple calcareous cement, water cement, and maltha.

The following are some of the best methods of preparing durable cement:—

Sharp sand, free from clay, salts, calcareous, gypseous, or other grain less hard and durable than quartz, is the best. When a coarse and a fine sand, similar in the size of their grains to the coarse and fine sand described below, cannot be obtained in the locality, ready for use, the following method of cleansing and sorting it may be employed. Sift the sand by streaming clear water through a sieve that will permit all grains not larger than one-sixteenth of an inch to pass, the water being so regulated as to wash away the finer particles of the sand, clay, and all lighter matter. The coarse rubbish remaining in the sieve must be thrown aside. The sand which has passed through the sieve must be further cleansed and sorted into two parcels, by means of a sieve that allows no grains to pass but such as are less than one-thirteenth of an inch in diameter. That portion which passes through this sieve, may be termed fine, and the other part coarse sand. Each should be dried either by means of the sun or a fire.

That kind of lime should be chosen which heats the most in slaking, and slakes in the shortest time when properly watered; which is fresh from the kiln, and has been kept close covered; which dissolves in distilled vinegar with the least effervescence, and leaves the smallest residue insoluble: and in this residue the smallest quantity of clays, gypsum, &c. Put fourteen pounds of such lime into a brass wire sieve, still finer than the one last mentioned. Slake the lime by alternately plunging it into and raising it out of a butt of soft water. Reject all the matter that does not easily pass through the sieve, and use fresh portions of lime in a similar manner, until as many ounces of lime have passed through the sieve, as there are quarts of water in the butt. This is the lime-water, which contributes materially to the excellence of the stucco. When it has received a sufficient portion of lime, it should be closely covered until it becomes clear; and then be drawn off, by means of wooden taps, placed at different heights, as the lime subsides, without breaking the crust formed on the surface. The less saline matter the water contains, the better will be the quality of the liquor; which should be kept in air-tight vessels till used.

Slake fifty-six pounds of lime, chosen as before directed, by gradually sprinkling on it the lime-water. Sift the slaked portion of the lime immediately through the last mentioned fine brass wire sieve. The lime which passes must be used quickly, or kept in air-tight vessels, and the rest rejected. This finer, rich part of the lime, may be called purified lime. It is better to sift the lime immediately after the slaking, in order to prevent the ill-burnt lime and other objectionable matter from passing through the sieve.

To mix this cement, take fifty-six pounds of coarse, and forty-two

pounds of fine sand, mixing and spreading it so far as to form a flat bed of six inches deep. To this, as much lime-water must be added as it can possibly retain. To the moistened sand add fourteen pounds of the purified lime, in several successive portions, and mix them well. Lastly, add fourteen pounds of bone-ashes, thoroughly mixing and beating the whole together. As the above cement is shorter than water or common stucco, and dries sooner, it should be worked expeditiously; and, in stuccoing, should be laid on by sliding the trowel upwards. The ground on which it is to be laid, ought to be first well moistened with lime-water; and the same applied to the cement should it require moisture.

The above proportions are adapted for a quick drying cement, to be used in exposed situations, where the effects of powerful sun and rain might speedily follow the application. Half the above quantity of bone-ashes will in general be found to be sufficient, though it will not thoroughly harden as soon; yet, should the weather be favourable, it will be stronger.

For a cement of a fine quality, take ninety-eight pounds of the fine sand, and let it be moistened and mixed with the lime-water, purified lime and bone-ashes in the quantities and manner above described; except by using an additional pound of lime.

To mix a coarsely grained cement, a coarser sand than that described must be used; of which take fifty-six pounds; of the coarse sand before mentioned, twenty-eight pounds; and of the fine, fourteen pounds. After mixing and moistening it with lime-water as before, add fourteen pounds of purified lime; and the same quantity of bone-ash. When these cements are required to be very light-coloured, the whitest sand, lime, and bone-ash should be employed. Gray sand and half-burnt bones form a gray-coloured cement; and any other colour may be obtained either by the use of coloured sand, vitreous or metallic powders, or other ingredients.

If any of the above cements are required for water-fences, two-thirds of the above given quantity of bone-ashes should be substituted by an equal portion of powdered terras; and if the sand used be fine, the quantity of terras must be increased, so as to be equal in weight to one-sixth of that of the sand.

For a cement of the finest grain, or in a fluid state, to be applied with a brush, to finish and smooth the surface of coarse cements, or for the purpose of giving to a wall a uniform and lively colour, the fine powder of calcined flints, or the powder of any quartzose or hard earthy substance, may be used in the place of sand; but in a less quantity, proportionate to the fineness of the powder, so that it shall not exceed six times the weight of the lime, nor be less than four times. A wash for walls should not be of a greater consistence than new cream, and should be used in dry weather; and if it is intended to represent a warm light coloured stone, a fine yellow ochre is the cheapest colouring matter.

Terras powder and lime, as a water or aquatic cement, possesses the quality of setting quickly, and being impenetrable; but it requires to be kept constantly wet, otherwise it is apt to crack and perish when

exposed to the action of the air; yet it never attains the same degree of hardness, neither will it endure the weather, equal to cement made with lime and sand. Terras is a volcanic production, and its component parts are clay and oxide of iron; and powdered baked clay may be employed as a substitute, as it gives similar properties to cements in which it is introduced. Dutch terras consists of a soft rock stone found in the vicinity of Cologne, is calcined like lime-stone, and afterwards reduced to a powder. It is in great repute in aquatic works, but its price is considerable. A substitute may be formed by mixing two parts of well-sifted coal-ashes with one-part of lime; or, again, by mixing one of plaster of Paris with two parts of lime.

Pozzolana is a species of ashes thrown out of volcanoes, and differs little in quality from terras. The cement employed in the masonry of Eddystone lighthouse was formed of an equal measure of this substance and lime. But two parts of lime, one of pozzolana, and three of sand, may be used as a good cement for the generality of aquatic works.

The following is a valuable composition for a water cement, in which manganese forms a principal ingredient. Mix six parts of the black oxide of manganese, four of gray clay, and ninety of the best limestone; the whole of which must be well calcined. It may afterwards be mixed to the consistence of paste, by adding sixty parts of clean washed sand.

Parker's Roman cement consists of the following ingredients, and in the proportions here given:—

Carbonate of Lime	·647
———— Magnesia	·005
———— Iron	·070
———— Manganese	·019
Clay Silica	·180
—— Alumina	·066
Water	·013
	1·000

Two parts and a half of chalk, added to one of common clay, will make a good hydraulic lime, and it will act as soon as Parker's cement; and also a limestone containing six per cent. of clay, affords a cement perceptibly hydraulic. Lime, containing from fifteen to twenty per cent. is a strong cement; and when from twenty-five to thirty, it sets immediately, and will answer the generality of the purposes of Roman cement.

CENTERING.—In the framing of centres, the principal points to which the attention must be directed, are, an accurate calculation of the weight required to be supported, the exact quantity of timber requisite for such support, and the best methods of framing it.

CHIMNEY.—The aperture from a chimney into a room, is called the fire-place. The projecting parts of the wall, on the right and left of the fire-place, are named jambs. The head of the fire-place, supported by the jambs, is termed the mantle. The mantle, together with the whole side of the chimney above it up to the top, are called

the breast. The back points out its own situation, being on the opposite side to the breast. The sides of the fire-place, between the jambs and the back, are named covings. The throat is the opening between the mantle and back, immediately above the fire.

In rooms, half of whose length when added to their breadth, does not exceed twenty-five feet, the width of the fire-place may be four feet and a half. In those of thirty feet, it may be five feet. However large the room, if the width of the fire-place extend much above six feet, the effect will be injurious, supposing the grate to be proportionate. Under such circumstances, two fire-places are to be preferred. The fire-place, in ordinary rooms, is generally square; but in small rooms, and particularly when situated in an angle, its height exceeds its width. The width of a fire-place has no influence on the draft, if it be not too contracted to allow the covings from being placed with their greatest power of reflection towards the room; but the height to the under side of the mantle, ought not generally to exceed two feet six inches. The dimensions for the width of the throat may be five inches; but it should be supplied with a moveable part at the back. The strength of the draft is regulated in proportion as the throat is nearer to the fire. The flues of chimneys connected with fire-places from three to four feet wide, are usually above the throat, made equal to about twelve inches square; but the rule is, to make the opening in the horizontal section of the flue equal to that of the fire. Bends in flues should form curved and not angular lines; and the shafts should be carried to an equal height with any adjoining.

To increase the draft of a chimney, set the grate, if a Bath-stove, ten inches or a foot back from the face of the chimney-piece, leaving an opening of two inches between the back of the chimney and that of the grate. An ordinary grate will require the sides to be filled up with brick-work. According to this plan, the current of air that ascends at the back of the grate not only increases the draft, but likewise prevents the smoke from descending when influenced by the wind.

The expense of circular or oval flues is, doubtless, the reason why they are not generally adopted, as their advantages are well known; and particularly that of their being free from the currents of air, to which square chimnies are subject.

CISTERN.—A vessel used for containing water. Cisterns built of square stones, put together with the following cement, will never leak or require any repairs. Boiled linseed oil, litharge, red and white lead mixed together to a proper consistence, applied on each side of a piece of flannel, previously shaped to fit the joint, and then put between the joints before they are brought home, as it is technically termed, to their place by the fastenings employed, make a close and durable joint. The quantities of the ingredients may be varied, without inconvenience, taking care not to make the mass too thin with oil. Where flannel is found to be too thick a substance, linen may be substituted; or otherwise the stones need not be entirely bedded in it. An inch, or even less, of the edges that will be next to the water, require only to be so prepared; the rest of the joint may be filled with good lime This cement also answers for joining broken stones.

CITY.—In England, is " a town corporate, having a bishop, and a cathedral church."

In a town or city, the display of architectural skill ought not to be confined to the habitations of a few individuals; but should extend to the entire city. The greater number of our towns still exhibit evident proofs of that spirit of confusion and disorder, that pervaded all the public undertakings of our ancestors. Many cities present a mass of buildings, erected without system, economy, or design.

In a city, the streets cannot render the communications easy and convenient, if they are not in sufficient number to prevent any considerable returning, so conveniently large as not to occasion confusion, and in right lines, so as to shorten the communication. To render a town well constructed, the façades should not be abandoned to individual caprice. All buildings fronting a principal street, should be determined by and subjected to public authority; so as to form a part in the design fixed upon for the whole of such street.

The heights of the buildings ought to be proportioned to the width of the streets. Nothing produces a worse appearance than their want of elevation, when situated in large and spacious streets. However beautiful the buildings may be of themselves, under this disadvantage, they will appear low and diminutive, and present nothing either imposing or agreeable.

The façades of the houses should exhibit both regularity and variety. To produce in a street a proper character and effect, there must be a uniformity in its corresponding and parallel façades. The same design ought to reign in the whole space uninterrupted by another street; and should not be repeated in any of the corresponding spaces. The art of varying the designs, consists in the diversity of the forms and proportions employed, the greater or less application of decorative objects, and their different combinations. With these three resources, there is no necessity, in the greatest city, to repeat the same façade.

But the application of these decorative objects should be made with great discernment; also a building, remarkable for its simplicity, might judiciously be in the vicinity of another, exhibiting elegance and magnificence. By these means there would be produced that pleasing variety and harmony, which constitute the charm of decoration.

Our principal towns and cities contain edifices, whose real character calls forth all the different species of decoration possible to be employed. These public structures afford an opportunity of frequently relieving the appearance of the ordinary buildings, by their noble and predominant forms. Finishing the borders of the river passing through a town, in an appropriate manner, by placing on its sides large and commodious quays, so as to leave a spacious street between the houses and the river; and the whole should be constructed according to the intent of the general design.

CLAMP.—A means used in joinery, to prevent boards from casting. It consists in working the end of a board in form of tenons, or otherwise a tongue; a narrow piece is then chosen of equal thickness, whose length is equal to the breadth of the board, in the side of which either mortises or a groove are made; the fibres of the two pieces,

when thus applied, running at right angles to each other. The board is then said to be clamped.

CLEAR.—The distance between the two nearest bodies or surfaces.

CLEAR STORY WINDOWS.—Windows which are without transom.

CLINKERS.—A name sometimes given to bricks, containing a small portion of nitre, and which are, from having been placed near the fire in the kiln, more burnt than the rest of the bricks. The term is also applied to hard brimstone coloured bricks, imported from Holland. They are generally used in paving stables and yards; for which purposes they are often laid herring-bone ways. Their length is six inches, breadth three, and thickness one inch.

CLOSER.—A part of a brick, or a stone, laid to complete a course, when the last remaining space is less than the usual size.

CLOSET.—A small room belonging to an apartment or bedchamber.

COARSE STUFF.—A composition of lime and hair employed in first coating and floating.

COAT.—One thickness of plastering.

COCKLE STAIRS.—Applied to a winding staircase.

COFFER.—Sometimes used to signify panels in the soffits of cornices, architraves, and ceilings.

COIN.—The masonry under the base of a column or pilaster, when situated on an an inclined plane. Likewise applied to the angle of a building.

COLLARIN.—COLLARINO.—The neck of a column, or the space comprised within the astragal and the lower part of the capital.

COLLAR-BEAM.—A beam extending across; and is, in ordinary roofs, framed into the rafters; but in trussed roofs, it is framed into the queen-posts.

COLONNADE.—A range of columns surrounding the interior area or the exterior of an edifice; forming galleries of communication or an ambulatory

COLUMN.—A cylindrical support, composed of a base, shaft, and capital.

COMPARTMENT CEILING.—A ceiling decorated with panels or coffers.

COMPOSITE ORDER.—*See* the DIRECTOR.

CONGE.—*See* pl. 2; fig. 9.

CONO-CONIC ARCH.—A name given to the arches resulting from the cono-conic groin.

CONO-CONIC GROIN.—The groin formed by the intersection made by a lesser conic vault, entering or piercing a similar vault of greater height.

CONSERVATORY.—A building for the preservation of exotic plants; and which is sometimes so connected with a house, as to communicate with one of the principal apartments.

CONSOLE.—*See* pl. 38, 39, 43 to 47.

CONSTRUCTION.—The execution of architectural designs.

CONTINUED.—Any member or part not broken or interrupted, is said to be continued.

CONTOUR.—The outline of any part; as of an entablature, volute, or the shaft of a column.

COPING.—Masonry which projects beyond the face, and crowns the upper course of a wall. There are three kinds: saddle-backed, feather-edged, and parallel coping. The first is thin at each edge and elevated in the middle; the second is thicker at one edge than the other; and the third is of an equal thickness.

COPE OVER.—The soffit of a projecting body, when it inclines towards the wall.

CORBEILS.—The masonry or timber in a vault or wall, intended to receive the timbers of a floor or roof.

CORDON.—The exterior edge or coin in masonry.

CORE.—The middle of a wall.

CORINTHIAN ORDER.—*See* DIRECTOR.

CORNICE.—The upper member of an entablature. A block cornice has its drip supported by plain rectangular blocks. A mutilated cornice is one that is broken or interrupted by some intervening body. An architrave cornice, signifies an entablature in which the frieze is omitted; and a coved cornice presents a concave form.

CORONA.—The drip or larmier of a cornice.

CORRIDORE.—A passage leading to different apartments.

CORTILE.—A court-yard or area in the centre of a mansion; which is often surrounded by galleries of communication.

COTTAGE.—A small and humble habitation, which serves as a dwelling for persons of the labouring class.

The following suggestion is given by Mr. Miller, of Glasgow:—"Suppose clay can be got close by where you mean to build, work the clay well; then put it into wooden moulds, the same as bricks; when the walls are at their required height, bore the outside of the walls full of little holes, about the size of your little finger. When this is done, have ready a mixture of smithy ashes, lime, and sand; let these ingredients be well wrought with water; then plaster the outside of your walls with this mixture. In a short time it will be as hard as some kinds of stones, and will resist frost and water, and stand one hundred years."—"A man can wheel from the pit, clay for 4,000 bricks in a day, 2s.; ditto can work clay for 4,000 in one day, 2s.; ditto can mould 4,000 in a day, 2s.; ditto can carry to the builder's hand 4,000 in a day, 2s.; ditto building 4,000 bricks in three days, 6s.; lime for building, 4,000, when it can be got reasonable, 16s.—Total 1*l.* 10s. Eight or ten thousand bricks will build a neat and commodious cottage, with four apartments."

COUNTER FORT.—A buttress or pier, employed to give additional strength to a wall.

COUNTER LATH.—A lath fixed between every two gauged laths.

COUNTERSINK.—To sink or let-in the heads of screws, bolts, plates, &c. into wood-work.

COUNTRY HOUSE.—*See* the DIRECTOR.

COUPLED COLUMNS.—Two columns placed so near each other as almost to touch.

COURSE.—In masonry and bricklaying, signifies a horizontal range of stones or bricks, extending the entire length of a wall.

COURSE.—In slating, is a row of slates which have their bottoms placed or ranged horizontally.

COURT.—An area at the front, back, centre, or sides of a building

COUSINET.—CUSHION.—The first stone of an arch above the impost. Also applied to the form connecting the volutes in the side elevation of the Ionic capital.—*See* pl. 10, 11.

COVE BRACKETING.—Concave brackets, forming the quadrant of a circle.

COVED AND FLAT CEILING.—One that rises from the wall of an apartment in a concave form; and which immediately terminates in a flat surface.

COVER.—In slating, that part of a slate which is covered by the lap of another.

COVER WAY.—The vacancy left in walls to receive the timbers of the roof.

CRADLING.—A term given to the woodwork that serves for the support of entablatures over shop windows. The ribs to which the lathes are nailed in vaulted ceilings.

CRAMP.—A piece of metal employed to bind stones together.

CROSS-GRAINED STUFF.—Timber in which the fibres run in contrary directions.

CROSS-VAULTING.—A term synonimous with groins.

CROWN-POST.—JOGGLE-POST.—KING-POST.—The centre post in a trussed roof.

CUPOLA.—When an edifice presents an interior and an exterior dome, the appropriate name for that in the interior, is a cupola.

CURB.—A rib of wood fixed at the angle or noosing of brick steps, for the purpose of keeping the brick-work compact.

CURB PLATE.—A term given to the plate of a sky-light, and the wall-plate of a ribbed dome.

CURTAIN STEP.—A step having its outer end worked in the form of a scroll; being the lowest in a staircase.

CYLINDRIC CEILING.—WAGGON-HEADED CEILING.—A simple vaulted ceiling, forming any portion of a cylinder not exceeding half.

CYLINDRIC GROIN.—Similar portions of cylinders of equal height, piercing or intersecting each other.

CYLINDRO-CYLINDRIC ARCH.—The line formed by the intersection of two cylindrical vaults of unequal height.

CYLINDRO-CYLINDRIC GROIN.—A groin formed by the intersection of cylindric vaults of unequal height.

CYLINDRO-SPHERIC ARCH. The line of intersection made by a spheric vault of less height, into a cylindrical vault that is greater.

CYLINDRO-SPHERIC GROIN.—A groin made by a spheric piercing a cylindric vault, the latter exceeding the former in height.

CYLINDROIDIC GROIN.—Made by the intersection of spheric vaults.

CYMA RECTA.—*See* pl. 2, fig. 6.

CYMA REVERSA.—*See* pl. 2, fig. 5.

CYMA TALON.—*See* pl. 2, fig. 4.

D.

DEAL.—The timber of the fir tree, when sawn into boards, planks, and various pieces of different scantlings intended to be employed in buildings. Of this wood there are two kinds, the white and the yellow; the latter being generally used in out-door work.

DECASTYLE.—A portico, composed of ten columns.

DECORATION.—*See* the DIRECTOR.

DENTILS.—Indentations used in cornices of the different Orders. *See* pl. 8, 10, 14, and 18.

DESIGN.—*See* the DIRECTOR.

DETAILS.—Drawings on a large scale, for the guidance of those engaged in the execution of the work; and hence they are named working drawings.

DIASTYLE.—Intercolumniations of three diameters.

DIE.—The body of a pedestal, comprised between the cornice and base. *See* pl. 3.

DIE.—In plastering, this term is applied to plaster that has lost its tenacious quality.

DIMINISHED BAR.—Bars in a sash window, which gradually become thinner as they recede from the glass towards the room.

DIMINISHED ARCHES.—Arches having less than their semidiameter in height.

DIMINUTION.—Signifies the tapering or diminishing of the shaft of a column.—*See* pl. 23 and 24.

DINING ROOM.—This is often one of the most spacious apartments in a house; varying in length from twenty feet, to nearly three times that dimension, according to the size of the house.

DIPTERON.—Two ranges of columns surrounding the cella of an antique temple.

DISCHARGE.—An overloaded piece of timber is said to be discharged, when a post is trimmed under it, or brickwork carried up.

DISCHARGING ARCHES.—Segmental arches built over apertures, wooden lintels, or any part not capable of supporting the weight required.

DISCHARGING STRUTS.—This term has the same significations in its general use, as principal braces, or auxiliary rafters.

DISHING-OUT.—Synonimous with cradling.

DISPOSITION.—This term comprehends not only the situation and arrangement of the different parts of a plan, but likewise that of every architectural object exhibited in the elevations and sections of a design.

DOG-LEGGED STAIRS.—Stairs without well-hole. The same vertical planes contain the balusters and rail of both flights, the steps of which are fixed to strings, carriages, and newels.

DOME.—This word is commonly used indifferently with cupola ; but the application of the word dome is more appropriately employed to express the exterior construction or convex surface of these architectural objects ; and that of cupola, to the interior concave surface.

DOOR.—The dimensions of doors are determined by the height of the story, and the extent of the building for which they are intended. The doors of private houses can seldom exceed four feet in width ; but three feet is the general dimension. The proportion between the height and breadth of small doors may be as seven to three ; for those of larger dimensions, double their breadth will suffice for their height. Doors serving as entrances to extensive mansions may be from five to six feet wide, and those of public edifices from six to ten feet. Doors of large dimensions should have folding leaves. The use of folding doors, in respectable dwellings, possess many advantages over cumbersome partitions, when it is required to form two apartments into one.

DOOR FRAME.—It is sometimes formed of two upright pieces and a head; which are wrought, beaded, rebated, and framed by mortise and tenon ; and at others it consists of linings, with facings formed by architraves, pilasters, or columns.

DORIC ORDER.—*See* Director, and pl. 5 to 8.

DORMANT, OR DORMER WINDOW.—A vertical window projecting from a roof, having its lower part resting upon the rafters.

DORMITORY.—A sleeping room in a public establishment.

DOUBLE FIR LATHS.—The laths employed for the ceilings of best apartments and staircases ; and which are three-eighths of an inch thick.

DOVE-TAILING.—Fastening boards together by letting one piece into another, by means of projections and indentures resembling triangles.

DRAGON BEAM, OR PIECE.—That piece in the framing of a roof which assists to support the hip rafter.

DRAG.—DRAGGING.—A door is said to drag, when it rubs the floor in opening or closing.

DRAWING, OR WITHDRAWING ROOM.—One of the most spacious and elegant apartments in large houses, and which is used for the reception of company after meals.

DRESSING.—When the stones intended for building have been squared and faced solely with a hammer, they are then termed hammer-dressed. When faced with chisels, the work is called tooling ; and the stones themselves are said to be tooled. If the surface is required to be smooth, their faces are rubbed with another stone of large dimensions, and sand and water applied. Dressing is likewise applied to many decorative objects on exterior walls and surrounding apertures.

DRESSING ROOM.—A small room adjacent to a bedchamber.

DRIFT —THRUST.—SHOOT.—The horizontal force applied by an arch, against the piers or abutments.

DRIP.—This term signifies the same as larmier or corona.

DRIPPING EAVES.—Those parts of slated or tiled roofs which project beyond the face of the wall, when they are without gutters.

DROPS.—Ornaments placed under the soffit of the cornice, and at

the lower extremity of the triglyphs of the DORIC ORDER.—*See* pl. 6, 8, and 21.

DROVED ASHLAR.—The most common sort of hewn stone.

DWARF WALLS.—Low walls in general; but particularly those under ground floors, and others that surround buildings, and which are often surmounted by ornamental railing.

E.

EAVES.—The lower edges of the sides of a roof projecting beyond the face of the walls.

EAVES LATH, OR BOARD.—A board wrought to a feather-edge, and placed under the bed of the first row of slates at the eaves.

ECHINUS.—The principal moulding in the DORIC capital, placed immediately under the abacus.

EDGING.—Working the edges of rafters or ribs to the same level.

EDIFICE.—A term that can only with propriety be applied to public structures.

ELBOWS OF A WINDOW.—The flank under each of the two shutters. They are generally panelled.

EMBOSSING.—If a depression be made with a blunt instrument on the surface of wood, the depressed part will again rise to its original level by being immersed in water. Accordingly, if the wood to be ornamented be stamped with a steel tool or die, in the parts intended to be raised, and then planed or filed down to the level of these parts, it will, on being immersed in water, exhibit above the surface, the exact impression of the pattern which was stamped on it with the instrument. This raised impression, or embossed work, may then be finished by the usual operations of carving.

EMBRASURE.—The interior splaying or enlargement of the sides of a door or window, for the greater convenience of the door, or to increase the volume of light.

ENGAGED COLUMNS.—Such as have a small portion of their diameter engaged in a wall. *See* pl. 27 and 32.

ENSEMBLE.—This term is generally used to signify the total of an architectural design. It is likewise, on some occasions, employed to express the general harmony and unity exhibited.

ENTABLATURE.—It is composed of an architrave, frieze, and cornice. *See* pl. 4, 6, 8, 10, 14, 18, 25, 38, and 39.

ENTASIS.—The almost imperceptible curved outline of the shafts of columns. *See* pl. 23.

EQUI-ALTITUDINAL GROIN.—The groin which results from the cross vaults being of equal height.

EQUI-ANGULAR GROIN.—That in which the axis of each vault form similar angles at the same point.

EQUI-LATERAL GROIN.—That in which the breadths of the cross vaults are equal.

EURYTHMY.—An harmonious relation between the parts and the whole of an architectural production.

EUSTYLE.—An intercolumniation of two and a quarter diameters.

EXCHANGE.—A public edifice in which brokers, merchants, &c., assemble to transact business.

EXTRADOS.—The exterior curvature of a vault or arch.

EYE OF A VOLUTE.—A circular figure in the centre of the spiral contour of a volute. *See* pl. 10 and 12.

F.

FAÇADE.—This word, though synonimous with elevation, refers more strictly to the principal or entrance-front of a building or edifice.

FACE MOULD.—Applied by joiners to the patterns from which they cut hand-railing, &c.

FACE OF A STONE.—Its exterior surface; which should always be in a contrary direction to its splitting grain.

FACINGS.—The wood work fixed round the openings of doors and windows in the interior of buildings.

FALSE ROOF.—The space comprised between the roof and the ceiling of the upper story.

FASCIA.—The band of an architrave. This term is likewise on some occasions applied to the moulded work over the windows of brick buildings, but not including the upper range.

FEATHER-EDGED BOARDS.—Such as are wrought thinner on one edge than on the other.

FENCE WALLS.—Such as are used for inclosures.

FILLET.—*See* pl. 2, Fig. 7.

FILLING-IN-PIECES.—Timbers of short dimensions, used in frame work, as the jack rafters of a roof.

FINE STUFF.—In plastering, it is used for ordinary walls and ceilings, set for colour or paper; and is composed of slaked lime, passed through a fine sieve; to which is added a suitable quantity of hair, and on some occasions a small portion of fine sand.

FINISHING.—This is the third and best coat of three-coat plaster, when intended for stucco. The best is twice hand-floated, properly trowelled, and is composed of sand and fine lime. When the third coat is composed of fine stuff, and intended for paper, the work is termed setting.

FIR-IN-BOND.—Signifies bond-timbers, wall-plates, and lintels.

FIRST COAT.—When the first of two-coat work, and the same of three-coat work, is applied to brick-work, the former is termed rendering, and the latter, roughing-in. Likewise when the first of two-coat work is applied to laths, it is named laying; and the first of three-coat work, pricking-up.

FLATTING.—It is used as a finishing coat in inside painting, to avoid the gloss that common oil-painting gives to surfaces; to effect which a great portion of spirits of turpentine is used, and sometimes a small quantity of unboiled oil.

FLOATED LATH AND PLASTER SET FOR PAPER.—Is three-

coat work, the first of which is picking-up, the second floating, and the setting is fine stuff.

FLOATED WORK.—In plastering is such as is pricked-up, floated, and set.

FLOATING.—In plastering is the second of three-coat work.

FLOOR.—In carpentry, the timbers which serve to support the flooring boards and ceiling, are termed the naked flooring ; of which there are three kinds, single joisted floors, double floors, and framed floors.

A single joisted floor is composed of one range of joists ; but it admits of an improvement which will answer some of the purposes of a double floor, in situations that will not allow of the increased depth of the latter. It consists in giving every third or fourth joist an increase of depth, to which the ceiling joists should be notched and nailed, crossing the said joists at right angles. This method gives but a trifling increase to the thickness of the floor, yet it will not allow sounds to pass as freely as an ordinary single joisted floor, and the ceiling will stand better.

To make a strong single joisted floor, with the smallest quantity of timber, the joists should be thin and deep, but not less than two inches in thickness.

Where joists cannot have a bearing on the wall, as near fire-places, and flues, or from other causes, a piece of timber named a trimmer, is framed between two of the nearest joists that have a bearing on the wall. Into the side of this, the ends of the intervening joists that require to be supported, are mortised. This operation is termed trimming. The two joists that support the trimmer, are named trimming-joists, and are required to be stronger than the common joists, in the proportion of one-eighth of an inch added to their thickness for each joist supported by the trimmer.

When the bearing of single joisting exceeds eight feet, a single row of struts should be placed midway between the joists, to prevent their turning or twisting sideways, and to render the floor stiffer. When the bearing exceeds twelve feet, two rows of struts will be required ; thus adding one row of struts to each additional four feet in bearing. Each row of struts should be fixed so as to form one continued line across the floor. The quality of the ceiling depends in a great measure on their fitting. For this purpose the short ends of boards, nearly of an equal depth with the joists, inserted moderately tight, will answer every purpose ; and when simply nailed, they are preferable to keys mortised into the joists ; being at the same time a saving in labour, and the strength of the joists is preserved by the omission of the mortises.

Single joisting may be used, for ordinary purposes, to any moderate extent for which the necessary scantlings of timber can be obtained, excepting where a good and perfect ceiling is required, when the bearing should not exceed fifteen feet. In any case, where the passage of sound is to be prevented, a framed floor will be preferable.

A double floor is formed of binding-joists, bridging-joists, and ceiling-joists. The former constitute the principal support of the floor, and have the bridging-joists notched upon their upper sides ; and the

ceiling-joists are either notched, or framed, with chased mortises between their lower sides.

The only difference between framed floors and double floors, consists in the binding-joists of the former being framed into large pieces of timber, named girders. Girders should, invariably, when employed for long bearings, be made as deep as may be practicable; for the loss of a couple of inches in the height of a room is trifling, compared with a cracked and uneven ceiling, and an unsteady floor. The most straight-grained of the two surfaces forming the breadth of a girder, should be placed for the under side; and as the greatest strain is exactly midway between the two extremities, it is advisable so to arrange the mortises, that they shall not fall precisely in that point. Neither should girders be built into the walls; but, the portion at each end, that beds on the walls, which varies from nine to twelve inches, according to their bearing, should have a flat stone laid over it, or otherwise an arch, for the purpose of carrying the wall above. It is better not to lay girders over openings, except when found to be indispensable; on which occasions the wall-plates or templets should have a proportionate scantling and length to transfer the weight to the piers. The latter method is generally preferable to laying girders very obliquely across an apartment.

The principal part of the observation made on single joisting, applies equally to bridging-joists. They should seldom be less than two inches in thickness; but, when laid upon sleepers, on ground floors, there is generally a little addition made to their scantling. In such situations, if proper care be not taken to ventilate and drain the under side, the durability of the joists will be comparatively short. The application of smiths', or even common ashes, laid from one to two feet deep beneath such floors, will contribute greatly to the preservation of the timbers. The best are the ashes and scoriæ from founderies, or any ashes containing iron.

Ceiling-joists do not require to be thicker than for nailing the laths; for which purpose, two inches will generally be found sufficient. To notch and nail ceiling-joists to the under side of the binding-joists, will generally be found better than to mortise and chase them in; for it not only diminishes the labour, but by it the strength of the binding-joists is preserved, and the ceiling stands better.

In conclusion, it may be observed, that single-joisting forms a floor of greater strength than a double or framed floor; though each shall contain an equal quantity of timber, and may be made with the same ease to a similar extent of bearing; but the ceiling is more liable to cracks and irregularities; and hence single-joisted floors of long bearings are only adapted to common buildings. To ensure a perfect ceiling, a double floor is requisite; but for an extensive bearing, a framed floor is the most suitable.

When the ends of the joists of floors are supported by walls of considerable height, the middle of the joists should never bear upon any partition which extends no higher than the under side of the floor; otherwise the unequal settlement of the walls may cause the floor to be unlevel, and probably injure the ceiling.

The strength of wall-plates and templets should be regulated by the extent of the span. The following may serve for general purposes :—

		Inches.		Inches.
For a 20 feet bearing, wall-plates	-	4½	×	3
30 - - - - -	-	6	×	4
40 - - - - -	-	7½	×	5

Floors should be framed so as to be three-quarters of an inch higher at the centre than at the sides; the same as ceiling-joists, which should be three-fourths of an inch higher in twenty feet in the middle than at the sides, to allow for the settling of the floors.

FLOORING BOARDS.—The best wood for flooring, is the fine yellow deal, as it retains its colour longer than the white kind. These boards are sorted into three classes, which differ in quality and breadth; and the choice of them is regulated by the description of building for which they are intended. The first of these kinds is free from cross-grained stuff, shakes, sap-wood, or knots. The second is likewise without sap-wood and shakes, but not free from small sound knots. And the third sort is formed of the residue of the two preceding kinds. The best boards are about five inches broad, while the breadth of the common extends to nine inches.

A variety of methods is practised for jointing and fastening floor-boards to the joists. The ordinary way is to work the edges to a straight line, so as to be square with their surfaces; after which they are pressed close to each other, and nailed through their upper surface. When the boards are suspected of not being sufficiently seasoned, the practice often resorted to is to fasten the first and fourth boards in the usual manner, allowing a little less space between the two than the breadth of the boards; and the same with every other fourth board. The intermediate boards are then laid together, and the meeting of their middle joint necessarily causing them to form an obtuse angle, these edges being a little bevelled, a sufficient force or weight is then applied to this part to bring them to a level. The boards by this operation are said to be folded, and their edges being nailed through the surface, the heads are hidden by putty.

The best floors are either plowed and tongued, rebated, or dowelled. The dowelling of the joints of boards consists in inserting wooden pins in their thickness, parallel with their surfaces; one half of each pin entering the two edges of every couple of boards, which are best placed when midway between the joists. In the best work of this kind, the nails are driven in a slanting direction through the outer edge of each board, in the process of laying; by which means they are concealed when the floor is finished.

When flooring boards are either plowed and tongued or rebated, so as to allow the edges to lap over each other, both methods prevent the appearance of crevices in the event of the boards contracting or running-in; but they are necessarily more expensive.

In case of boards not being of sufficient length, the headings should invariably rest upon a joist; nor should those of two adjoining boards,

be in the same line These are jointed in various ways; namely, square, plowed and tongued, or splayed.

In laying floors, the boarding towards the doorways should rise a little; which prevents the doors from dragging, and at the same time enables them to clear the carpet.

The general method of measuring floors is by squares of ten feet on each side. Hence by multiplying the length by the breadth, and cutting off two decimals, the contents of a floor in squares will be given. Thus 24 by 18 gives 432, or 4 squares and 32 decimal parts.

FLUE.—Applied to the cavity or funnel which rises from a fireplace.

FLUSH.—Used in joinery to signify that the part spoken of has its surface even with that of another, with which it may be connected.

FLUTINGS.—Segmental cavities in the shafts of pilasters and columns. *See* pl. 6.

FLYERS.—Stairs or steps having their risers parallel to each other.

FOLIAGE.—Compositions of leaves used in architectural decorations.

FOOTINGS.—Broad courses projecting beyond each face of the superincumbent wall, for the purpose of furnishing it with a firm base.

FOOT-PACE.—A broad tread situated between the lower step and landing. Also applied to a horizontal piece of handrailing over such part.

FORUM.—Adjacent to the antique temples and basilicas, other public edifices were situated; as the ærarium or treasury, curiæ or town-hall, bank, exchange, public library, markets, and prisons; which were so arranged and connected together, as to form one total, named the forum, or market-place. Thus, the first forum which ancient Rome possessed, being the Forum Romanum, naturally occupied the centre of the city. It is the earliest established part in the foundation of a town or city, because it comprises all that relates to the necessities of life and the affairs of commerce. It formed the general rendezvous for all transactions, and a great number of the inhabitants passed a considerable portion of the day there. As this city increased in extent, it assumed the appearance of a union of several cities; thence each quarter or district contained its own forum. Ancient Rome had seventeen of these public places; fourteen of which were appropriated for the sale of different commodities, and were named fora venalia. The others were used for holding meetings for the arranging of public affairs, for the administration of justice, &c.; and were named civilia and judiciaria.

The area in the centre of the fora, was two-thirds of its length in breadth. Those of Greece were square. It appears from Vitruvius that the fora of Rome were environed by two ranges of galleries, situated above each other: as he recommends that the superior columns should be one-fourth less in height than those below. It was under the lower gallery that the shops and stores were situated. These contained for sale the different articles of commerce, leaving a sufficient space for free passage between the fronts of these and the columns. The upper gallery was arranged for the transaction of public and private business.

FOUNDATION.—There are two kinds of foundations, natural and artificial. In the former, the ground presents a hard bed of gravel or rock; and in the latter it consists of sandy, boggy, or loose earth; when piling, or similar means are employed to obtain a sufficient solidity. When the ground is found to be very objectionable, after having sunk a requisite depth, dry straight-grained piles should be used, whose sides are equal to one-twelfth of their length; this latter being regulated by the depth it may be to the solid earth, which they ought to reach, and should be driven as close to each other as the weight of the intended building may require. If the quality of the ground be equal, and not very objectionable, it may be strengthened by placing pieces of sound oak about two feet distant, firmly bedded across the bottom of the excavation made for the wall. Over these, planks of oak or pitch pine may be laid, having a foot more in width than the intended foundation wall, and should be spiked upon the pieces below. Ground of the same kind may also be strengthened by another method, which consists in laying firmly, and near to each other, a course of single stones, hammer-dressed, of a sufficient size to reach a foot beyond each side of the foundation wall. Another course, rather less in width, may be added; the joints of the upper meeting between those of the lower stones. The breadth of a foundation may be made double that of the intended superincumbent wall; the contraction being equal at each side. And if wood be laid in the trench of such foundation, the first course, whether of stone or brick, should be of a hard quality, so as not to imbibe moisture, should be laid as close as possible, and without mortar. These precautions are requisite for the preservation of the timber. When ground is solid only in parts, and these portions range with the planes or piers in the intended plan, inverted arches having half their width in depth, may be turned under the apertures, thus forming one continued base; that should the walls sink, the effect will be equal in all parts. Indeed, this precaution is necessary in all extensive buildings, as it will prevent the fractures presented in many parts of walls, which have good foundations; occasioned by the pressure of the low walling, under the apertures, not being equal to that of the piers: hence the unequal settlement. Should the hard or solid portions of the ground, in the foundations, be situated under the intended apertures, piers must be built in such places, and arches suspended, whose curvature at their apex should be increased, in proportion as the breadth of the pier intended to be built upon the centre of each, may be less. By this, as by the former method, the sinking will be uniform, if the ground be equally good under the piers.

FOX-TAIL WEDGING.—The forcing of a wedge down the middle of the end of a tenon, when framed into a mortise, in order to enlarge the extremity, and thus render it more binding.

FRANKING.—The method of making the joints of the cross-pieces in window-sashes.

FREE STUFF.—FROWY STUFF.—Such as is without knots, and is wrought with ease.

FRIEZE.—Is the part situated between the architrave and cornice an entablature.

FRIEZE-PANEL.—When a door presents six panels, this term is applied to the uppermost.

FRIEZE-RAIL.—In a door of six panels, the frieze-rail is placed immediately under the top rail.

FURRINGS.—Slips or flat pieces of wood used for the purpose of raising the sunken or hollow parts in rafters or joists, so as to form a level surface.

FUT.—The same signification as shaft, when applied to a column.

G.

GATHERING OF THE WINGS.—The joining of a flue with the breast of a chimney.

GEOMETRICAL STAIRS.—Such as are supported by having one end of each step inserted in the wall, and the lower edge of the riser of every upper step attached to the tread of the step next below. Thus rendering it impossible for them to descend either in a vertical or in an inclined direction.

GIRDER.—The beam used to shorten the bearing of the binding-joists in a framed floor.

Beams should be cut to a camber of about one inch, in a bearing of eighteen or twenty feet.

GIRDERS.

Length	Fir Scantling.			Oak Scantling.		
ft.	in.		in.	in.		in.
12	10	×	8	9	×	7
16	11¾	×	9¼	10½	×	8¼
20	13½	×	10½	12	×	9½
24	15	×	12	13¼	×	10¾

GLAZING.—Glaziers measure their work and materials by feet, inches, and twelfth parts of an inch; and estimate by the square foot. Windows are sometimes measured by taking the dimensions and area of one pane, and multiplying that quantity by the number of panes. But the more usual way is to take the length and breadth of the whole sash for the dimensions of the glazing. Circular and oval windows, fan-lights, &c., are measured as if they were square, taking their greatest length and breadth, in compensation for the waste of glass, and the additional labour in cutting it to the required shape.

To ascertain the quantity of glass required for six windows, each 5 feet 8 inches high, and 3 feet 2 inches broad.

	Ft.	In.	
	5	8	
	3	2	
	15		
	2	10	
		1	4
	17	11½	
		6	
Feet	107	8	

GROUND-JOISTS.—Those used for the bearing of the floor of the lowest story.

GROUND-NICHE.—One rising immediately from the floor of an apartment.

GROUND-PLATE, OR SILL.—Pieces of timber sometimes used in a lower story for the purpose of securing the ends of the flooring timbers, which are formed with tenons, and thus framed into the plates.

GROUNDS.—Small pieces of wood built in walls, to which bases, surbases, and architraves, are attached.

GROUT.—Mortar, rendered sufficiently fluid, by an additional portion of water, to fill all cavities that may remain in walls. In order to render it effective, it requires to be made from mortar that has been well mixed and beaten a length of time previous.

H.

HALF-SPACE.—The space introduced between two flights of stairs.

HALL.—*See* Director.

HALVING.—To cut away half the thickness from the ends of two pieces of timber in order to join them.

HANGING STILE.—That stile of a door to which the hinges are secured.

HEADERS.—In masonry, are stones placed lengthways across a wall. The same term is applied in bricklaying, when the length of the bricks is placed in the thickness of a wall; and should this arrangement be continued for an entire course, it is named a heading course.

HEAD-WAY.—Applied to a staircase, signifies the intervening place between the stairs or landing-place and the ceiling.

HEART-BOND.—In masonry, is the bond formed by a stone placed over two others of equal breadth, each of which extend to the middle of the wall.

HELIX.—The small volute which decorates the middle of each face of the Corinthian capital.

HEXASTYLE.—A portico of six columns.

HICK-JOINT POINTING.—A better kind of mortar inserted in the joints of brickwork, and made smooth with its face.

HIPS.—Timbers in an inclined position, situated at the angles of a roof.

HIP-MOULDS.—Sometimes signify the backs of a hip, and at others a pattern for setting it out.

HIP-ROOF.—When the meeting of each of the two inclined planes of a roof form hips, the roof itself is called a hip-roof.

HOLING.—The piercing of slates, through which to drive the nails.

I.

IMPOST.—SPRINGING.—The upper part of a wall or pier, forming the springing point of an arch. For examples of moulded imposts, *see* pl. 37.

INTERCOLUMNIATION.—The intervening space between two columns. *See* pl. 27.

INTERTIE.—A piece of timber framed horizontally between two posts, and serving as a tie.

INTRADOS.—The concave or interior surface of a vault or arch.

INVERTED ARCH.—*See* Foundation.

IONIC ORDER.—*See* Director, and pls. 9, 10, 11, and 12.

J.

JACK TIMBER.—Such as is of shorter lengths than the other timber employed in the same range.

JACK RAFTERS.—The short rafters which join the hips.

JACK RIBS.—Short ribs which join the angle ribs in domes and groins.

JOGGLED JOINT.—In masonry, is a method of uniting stones so as not to be divided by lateral force.

JOGGLE PIECE.—In carpentry, is a truss post. It is formed with shoulders, against which the ends of the struts abutt, and are secured in sockets.

JOINERY.—*See* each part under its respective head.

JOISTS.—All timbers employed in flooring except girders: namely, bridging, binding, and ceiling joists.

K.

KEY-STONE.—This is used by some synonymously with bond-stone; but its proper signification is the centre voussoir of an arch or vault.

KING-POST.—A post placed in the middle between the two principal rafters of a roof.

L.

LAP.—In slating, *see* Bond.

LATH FLOATED AND SET FAIR.—*See* Pricked-up, Floated and Set.

LATH LAYED AND SET.—Two-coat plastering, which, when applied to ceilings, is whited; and to walls, coloured.

LATH PLASTERED, SET, AND COLOURED.—Synonymous with lath layed, set, and coloured.

LATH PRICKED-UP, FLOATED, AND SET FOR PAPER.—Three-coat plastering. *See* each of these terms.

LAYING.—The first of two-coat plaster on laths, the surface of which is swept with a broom.

LIGHT-HOUSE.—FANAL.—PHAROS.—It was a beautiful problem of this kind, which Mr. Smeaton, the English engineer, solved so perfectly in the construction of the far-famed Eddystone light-house. He had to determine the form and dimensions of a building, which should stand firm on a sunken rock, in the channel of a swift ocean tide, and exposed to the fury of tempests from every quarter. Only he who has been driven before an irresistible storm in the darkness of night, and in the midst of dangers, and whose eyes have watched the steady ray from the light-house which saved him, can appreciate fully the importance of studies which afford such useful results. He feels how happy he is, to have fellow-men, whose talents, although exerted, perhaps, for individual good, are yet, by divine Providence, made to accomplish the most philanthropic ends; and to bind the whole of human kind into one great society of helping brotherhood.

LIME.—There are two kinds, the simple lime-stone, or pure carbonate of lime, and argillo-ferruginous lime, which contains previous to its being burnt, from one-twelfth to one-twentieth of clay and oxide of iron. The former when burnt is of a white colour; the latter inclines to yellow or brown, and when used becomes much harder than the other.

Lime should be used fresh from the kiln; for if suffered to slack by the moisture of the atmosphere, it shortly returns to the state of unburnt lime. Mortar that has lain exposed a considerable time, likewise loses its binding qualities, when the outsides of the heap are mixed with the interior mass. The following method precludes the necessity of preparing mortar except when required; and at the same time preserves the quality of the lime.

Take lime fresh from the kiln; and excavate a pit about four or five feet in breadth, and twice that length. By one side fix a wooden trough, of about six feet in length, two in breadth, and one in depth. At that extremity of the trough which should hang over the pit, make a hole of about six inches square, before which nail a grating of iron, with the bars about a quarter of an inch asunder. Inside the trough, fix a slider to cover the grating, which can, when required, be drawn up. Put two or three bushels of lime at a time into the trough; pouring a sufficient quantity of water upon it, and working it well with a hoe perforated with holes. When a sufficient quantity of liquid lime is formed, draw the slider, and the trough will empty itself into the pit. Throw more water on the remaining lime-stones; and those which will not slack, must be rejected. When lime, thus slacked, has been a few hours in the pit, it will take the consistence of paste, which it will preserve for years. It should be covered, to keep it clean, and to exclude the

fixed air floating in the atmosphere; as well as to preserve it from heat and cold, especially the latter, as frost destroys its quality. Small pits are preferable to those of larger dimensions, augmenting the number according to the quantity of lime required.

Lime thus prepared, when mixed with water, is much superior to whiting for whitewash; and, as it requires no size, is more wholesome; for the effluvia from size, which invariably attracts damp, causes a nauseous odour. It produces a resplendent white for ceilings, and possesses a peculiar tenacity on walls, and in situations exposed to moisture.

Lime, prepared according to this method, is equally good after remaining a considerable time in the pit; besides the advantage of always being ready for use; for when mixed with a little water, and a proper proportion of sand, mortar may be prepared in a few minutes.

LIME AND HAIR.—COARSE STUFF.—In plastering, is a composition of lime and hair, employed in first coating and floating.

LINTEL.—A short piece of timber, placed over the aperture of a door or window, to support the portion of the wall above. Lintels over windows usually bear only the interior part of the wall.

LOWER RAIL.—The bottom rail of a door.

LUCARNE, LUTHORN, OR DORMER WINDOW.—A vertical window, situated in the roof of a building.

LYING PANEL.—One that has its fibres in a horizontal position.

M.

MARGIN.—In a course of slates, that part is termed the margin, which is visible to the sight, or extends beyond the lap or bond.

MARGINS, MARGENTS.—In the framed work of joinery, it signifies the flat surface of rails and stiles.

MASONRY.—An attention to the position of stones, and to veins, or other signs that may indicate the existence of lamina, merit particular notice. Stones that are required to support a considerable weight, as piers, columns, and pilasters, should have the same position hat they had in the quarry.

The different stones intended to be used in the formation of columns and pilasters, should be so selected and arranged, that no difference in colour ought to be perceptible, so as to indicate the joints,which should be as few and as close as possible. To ascertain the exact diameter for each end of the stones so selected for columns, draw an outline of the shaft to the full size, dividing it into as many parts as there are separate stones; making each the precise height that it should be when wrought. This being determined, the extremities, or beds of each stone must be wrought to form exact parallel planes; on each of which, after finding their centres, the circles of their diameters may be described as given in the full-sized drawing. These circumferences may be divided into the same number of equal parts; which, for instance, may be six or eight; through each two of which, lines should be drawn

so as to pass through the centre, making those on the opposite bed of each stone exactly in the same plane, the extremities of such lines being designed to regulate the progress of the chisel along the face of the stone. One-third of the height of the shaft is cylindrical, and hence its surface may be determined by a straight-edge; but for the remaining two-thirds, a diminishing rule will be requisite for each stone, to determine its curvature or swell, and likewise to plumb in setting. To find the curvature of the diminishing rule, one of the methods presented in plate 23, may suffice, which should be applied to the first formation of the outline of the full-sized drawing, from which the curve of each rule ought to be taken. Hence to draw the curve from fig. 2, after having made the necessary lines at all the points from 1 to 7 inclusive, drive two nails, so far distant from each other, as to admit a slip or lath of wood, or any other flexible body; the nails being so placed, that either the inner or outer perpendicular surface of the lath shall correspond with the several points of diminution of 1, 2, 3, 4, 5, 6, 7. It only remains to mark a line along the surface of the lath, which will be the curve required. If it be required to flute the shafts, the following is the method to be adopted. If, for example, the columns be of the Ionic or Corinthian Order, to find the necessary divisions, take half of the diameter at each end, which when applied to the circumference, will divide it into six equal parts, each of which should be subdivided into four, making in the whole twenty-four divisions. Divide one of the last-mentioned divisions into four parts, taking half of one of these parts, and marking it on each side of the lines forming the twenty-four divisions; thus making the fillets equal to one-fourth, and the flutes to three-fourths of each division. The arrangements being completed, the lines required may be made with any finely-pointed instrument drawn close to the edge of a rule properly secured, and accurately placed to the divisions at each end. When pilasters require to be decorated with flutings, supposing the sides to be diminished, draw a line down the centre of the shaft, the height of which line may be formed into any number of equal divisions drawn across the face. On these, make the divisions for the flutes and fillets, in the proportions before given; and by fixing pins at each of the points, and applying a pliable lath, the lines may be drawn in the same manner as has been previously described for the diminishing rules of a column. *See* pls. 6, 11, 16, and 21.

The shafts of columns are sometimes set upon milled lead, which when employed, should not extend entirely to the surface, but so as to leave a small space round the surface to be filled with putty. But they are mostly set with oil-putty, or white lead mixed with chalk-putty, or fine mortar.

MIDDLE RAIL.—That rail of a door to which the lock is fixed.

MITRE.—The joint formed by two pieces of wood, each of which is ordinarily cut to an angle of forty-five degrees.

MODILLION, MODILLION CORNICE.—*See* pls. 12, 14, 21, 38, and 39.

MODINATURE.—The arrangement and distribution of the members, profiles, or mouldings of an ordonnance. This term, derived from

the Italian word modanatura, is not generally adopted; nevertheless. there is no other word capable of conveying the signification attached to it.

MORTAR.—The prevailing practice in London, is to mix two loads and a half of sand, with thirty-seven bushels, or one hundred weight and a half of lime.

In ordinary cases, it is better to slack only about a bushel of lime at once; employing no more water than may be sufficient to cause the whole to fall, and cover it immediately with sand, so as to retain the tenacious quality of the lime. This process may be repeated until the whole be slacked. It afterwards requires to be well beaten, adding to each bushel of lime about two and a half of sand; in incorporating which, the least quantity of water possible should be used.

MOULDINGS.—*See* pl. 2.

MOULDINGS.—In plastering, mouldings are successively run with coarse gauge, fine stuff gauge, putty gauge, and finished with raw putty.

MULLION.—A division, or large bar in a window.

MUNNION.—A vertical bar between the glass frames of a window.

MUNTINS.—MONTANTS.—The vertical pieces between the stiles of a door.

MUTULES.—Rectangular blocks placed under the soffit of a cornice.

MUTULE CORNICE.—*See* pls. 5, 6, and 21.

N.

NAKED FLOORING.—The carpentry of a floor, previous to the flooring boards being laid.

NAKED OF A WALL.—The even vertical face.

NAVE.—The body of a church extending from the western entrance to the rail or balustrade of the choir.

NICHE.—*See* DIRECTOR, and pl. 49.

O.

OAK.—*See* CARPENTRY.

OCTASTYLE.—A range of eight columns, situate at the principal façade in antique temples.

OFF-SET.—The space left on one or both sides of the upper surface of a wall, by the superincumbent part being reduced in thickness.

OGEE.—A name common to both the cyma-recta and cyma-talon. *See* pl. 2, fig. 4 and 6.

ORDERS—*See* DIRECTOR, and pls. 1 to 25.

ORDONNANCE.—This term, according to modern acceptation, is synonymous with disposition and distribution.

ORNAMENTS.—*See* pls. 20, 21, 52, to 55.

OVOLO.—The same as quarter-round. *See* pl. 2, fig. 2.

P.

PAINTING.—To prepare new wood-work for painting, apply to the knots newly slacked lime, which may be removed the following day, and twice rubbed over with white and red lead, mixed with either glue size, or linseed oil, bringing the raised parts each time down to a level. The whole may afterwards receive the priming colour, composed of linseed oil and white lead, to which a small portion of red lead may be added. The following are the principal colours employed in painting.—Red colours:—Carmine; a very valuable rich crimson colour. Florentine-lake, the kind in general use, and known by the name of lake: it is a very beautiful colour when first used, but it does not stand; but for which there is no proper substitute. Madder-lake, a colour recently brought into use, which without being so rich and bright a colour as that last mentioned, stands better, and answers many of its purposes. Rose-lake, or rose-pink, is merely a coloured chalk, which does not stand. Vermilion is a scarlet colour, which stands well; and whose brightness and inclination to a crimson hue, denotes its goodness. Red lead, or minium, is a colour which is apt to become black; hence it is seldom used, but for very coarse purposes. Indian red is a colour which is sometimes substituted for lake. Venetian red differs little from the common Indian red. Spanish brown is nearly of the same colour as Venetian red, and is only used for the commonest purposes. Light red, or burnt ochre, is an excellent colour, and stands well. Burnt terra di Sienna is a rich standing colour.

Blue colours:—Prussian blue is an extremely fine colour, when properly prepared, and stands tolerably well; except the common kind, which is apt to turn to a green or olive hue.

Yellow colours:—King's yellow is a bright yellow, which does not stand well. Naples yellow is a fine and durable colour. Yellow ochre is a permanent colour, but not bright. Roman ochre is a rich and superior ochre. Raw terra di Sienna is a fine warm and durable colour.

Green colours:—It is the practice to form the generality of the different shades of green, by the mixture of blue and yellow. Verdigrise is a bluish green colour; used for ordinary purposes, being without body, and not durable.

Brown colours:—Cologne earth is a useful dark brown mineral colour. Raw umber is a durable light brown colour. Burnt umber is a fine permanent deep brown.

White colours:—White lead is the same as flake white, but of an inferior quality.

Black colours:—Lamp black is a durable colour. Blue black is similar to ivory black, with a tint of blue.

When four-coat work is intended to be flatted, the proportion of oil and turpentine should, in the third coat, be equal; in the fourth, one of the former to two of the latter; and finished with colour mixed entirely with turpentine. The same process to be observed for stuccoed walls, if they are intended to be flatted; but they require an additional coat.

The less quantity of turpentine is used for exterior work the better, except for white, when it is customary to mix equal portions of this spirit and oil.

Painting is measured by girting round the surface of the mouldings and swelling panels, in taking the height. It is in general executed by the square yard, and valued according to the number of coats applied. Window-lights, railings, and similar parts, are commonly painted by the piece.

PAVING.—Paviors' work is computed by the square yard.

PEDESTAL.—A cubical body, composed of a base, die, and cornice ; serving as a basement to columns. *See* pls. 1 to 18.

PEDIMENT.—A triangular form, representing the gable of a roof. *See* pl. 26.

PERIPTERON.—Applied to temples surrounded by a single range of columns.

PERISTYLE.—Signifies a range of columns surrounding an edifice. But its present application is unlimited; sometimes being used to express a range of columns surrounding an interior area; at others, a gallery at the exterior of an edifice, presenting a line of columns ; and further, to the columns at the façade forming an entrance, or what is termed a portico.

PIAZZA.—This is in general used to signify a covered walk or gallery of communication, having its outer side decorated with arcades.

PIER.—That portion of an exterior wall situated between a coin and a window, two windows, or a window and a door.

PILASTER.—*See* Director, and pls. 11, 12, and 16.

PITCH.—When applied to an arch, it signifies the distance from the spring to the soffit of the key. If this term be applied to a roof, it means the difference between the height and the span.

PLASTERING.—The materials used in plastering are, coarse stuff, fine stuff, stuff, putty, plaster, gauge, and stucco.

PLATBAND.—The masonry of an architrave, formed of one or several stones, in one intercolumniation.

The general application of the word signifies the horizontal heads or lintels of doors and windows, a band situated immediately under a triglyph, and the bands which separate the panels or coffers in a compartment ceiling.

PLATE.—This may express either a floor or a roof plate, according as it is situated under the ends of the joists or the rafters.

PLINTH.—The lowest part of the base of a column, pilaster, or pedestal.

PLUMBERY.—Plumbers' work is, in general, done by weight. Sheet lead is of two kinds, cast and milled. That which is used in roofing, guttering, &c. commonly averages from seven to twelve pounds per square foot.

The following table expresses the weight of each square foot of sheet lead, according to its thickness. The left-hand columns contain the thickness of the lead expressed in tenths, hundreths, or other parts of an inch ; and opposite, in the right-hand columns, are the respective weights of a square foot. Thus the weight of a square foot of sheet

lead, one-tenth of an inch in thickness, is 5 pounds and 899 thousandth parts, which is nearly nine-tenths.

Thick.	lb. per sq. ft.	Thick.	lb. per sq. ft.
·1	5·899	·15	8·848
·11	6·489	·16	9·438
$\frac{1}{9}$	6·554	$\frac{1}{6}$	9·831
·12	7·078	·17	10·028
$\frac{1}{8}$	7·373	·18	10·618
·13	7·668	·19	11·207
·14	8·258	$\frac{1}{5}$	11·797
$\frac{1}{7}$	8·427	·21	12·387

POLYSTYLE.—This word is applied to an edifice, or to any part, interior or exterior, where the columns employed are of an extraordinary number.

PORCH.—A construction situated at the front of a house, for the purpose of sheltering the principal entrance.

PORTAIL.—The principal façade of a church

PORTICO.—In modern architecture, this word, in its limited sense, signifies a range of arcades, forming the entrance to an edifice, or a gallery of communication round an interior area. But, in the more general sense, it signifies a construction and decoration which precedes or embellishes the entrance to an edifice. And further, to any exterior or interior gallery of communication, in which either columns or arcades are employed.

POST.—A piece of timber employed in a vertical position; as quarters in partitions, truss, or door-posts.

PRICKING-UP.—In plastering, is the first of three-coat work upon laths.

PRINCIPAL RAFTER.—One of the inclined pieces of timber in a trussed roof. The following is a table of the scantlings of the principal rafters.

Bearing.	Fir Scantling.	Oak Scantling.
ft.	in. in.	in. in.
18	$6\frac{1}{4} \times 3\frac{3}{4}$	$7\frac{1}{4} \times 4\frac{1}{4}$
24	$7\frac{1}{2} \times 4\frac{1}{2}$	$8\frac{3}{4} \times 5\frac{1}{4}$
30	$8\frac{3}{4} \times 5\frac{1}{4}$	$10\frac{1}{4} \times 6$
36	10×6	$11\frac{3}{4} \times 7$

PROSTYLE.—Such amongst the antique temples as presented columns only at their principal façade.

PSEUDO-DIPTERON.—The dipteral temples were surrounded by two ranges of columns, forming a kind of double gallery, presenting eight at the front and opposite extremity, and fifteen at each side,

including those at the angles twice. In the pseudo-dipteron, the second range of columns was omitted; still preserving the full space between the columns and the wall of the cella.

PSEUDO-PERIPTERON.—That disposition in which the columns at the sides are engaged in the walls of the cella; instead of forming a gallery round the whole of the exterior.

PUGGING.—The method employed to prevent the passage of sound from story to story, effected by the plasterer laying stuff upon sound boarding.

PUNCHEON.—One of the short vertical timbers placed over the door in a stud partition, or any low post.

PURLINE.—A piece of timber serving to shorten the bearing of common rafters. The following is a table of the scantling of purlines.

Bearing.	Fir Scantling.			Oak Scantling.		
ft.	in.		in.	in.		in.
8	8	×	4½	7	×	4
10	9¼	×	5¼	8¼	×	4¾
12	10½	×	6	9½	×	5½
14	11½	×	7	10¼	×	6¼

PUSH.—*See* Drift.

PUTTY.—A fine cement used in plastering, made of slacked lime passed through a hair sieve; which, unlike fine stuff, is used without being mixed with hair.

PYCNOSTYLE.—An intercolumniation of one diameter and a half.

Q.

QUARTERS.—The pieces of timber employed in a stud partition.

QUARTERING.—The carpentry of a stud partition.

QUARTER-ROUND.—*See* pl. 2.

QUOINS.—*See* Coin.

R.

RAFTERS.—Pieces of timbers, which, standing by pairs on the raising plates, meet in an angle at the top, and form the roof of a building. They consist of principal rafters, hip rafters, and spars, or common rafters. The following is a table of the scantling of common rafters.

Bearing.	Fir Scantling.			Oak Scantling.		
ft.	in.		in.	in.		in.
8	4½	×	2½	4	×	2¼
10	5½	×	2½	5	×	2¼
12	6½	×	2½	5¾	×	2¼

RAILS.—These, in joinery, are stuff which have each extremity cut in tenons; and, when framed, are placed horizontally.

RAISING PLATES.—WALL PLATES.—TOP PLATES.—Horizontal pieces of timber, generally flush with the inside of the walls, serving to rest the ends of the timbers of the roof upon.

RANDOM COURSES.—Irregular courses, in paving, without uniformity in the joints.

RECTANGULAR GROIN.—The vaults of this groin have their line of axis at right angles to each other.

RENDERED AND FLOATED.—FLOATED, RENDERED, AND SET.—Three-coat work.

RENDERED, FLOATED, AND SET.—Three-coat work, when floated and set for paper.

RENDERED AND SET.—Two-coat work upon walls.

RETURN.—The side forming an angle with a corresponding straight surface, is named the return.

RIDGE.—The line formed by the meeting of the two inclined surfaces of a roof.

RISERS.—The vertical parts of stairs, serving to join the treads.

ROOF.—This term includes not only the exterior covering of a building, but is likewise applied to the carpentry by which it is supported.

In order to determine the pitch of a roof, the nature of the covering material should be considered. Thus, for lead, one-fourth of the span may be taken for the pitch of the roof. For pantiles, three-eighths of the span may serve. And for plain tiles, one-fourth of the span.

In proportion to the lightness of the covering material, the pitch of a roof may be reduced; and hence the proper inclination for slates may be regulated by their weight, compared with that of the materials already given.

The following is the average weight of the covering laid upon forty-two square yards of roofing, according to the material employed.

Materials.	Weight
Copper	4 cwt.
Fine Slate . . .	26
Lead	27
Coarse Slate . . .	36
Tiles	54

ROUGH CAST.—The application of plaster, without its being smoothed.

ROUGH RENDERING.—One coat rough.

ROUGH STUCCO.—Finished with stucco floated, and slightly brushed with water.

ROUGHING-IN.—The first of three-coat work.

RUDENTURE.—CABLE.—A form resembling a shaft or cord; which fills the lower part of the flutings of the Ionic and Corinthian columns, in order to preserve them from injury.

RULES.—Architecture, unlike those arts in which the rules are imperative, admits of modifications in all its constituent parts; which are governed by the character of the edifices, the situation of the site, &c. These constituent parts, and the rules which govern the proportions of their details, are means only whereby an expression of character is given to an edifice; the judicious application of which evinces genius, and distinguishes the man of talent from the mere copyist. Such of these parts as apparently rest on a system of the most fixed proportions, and between which a constant and uniform relation exists, though unvarying in their regular and symmetrical organization, are nevertheless susceptible of being modified in their application, according to the expression of character which is required. So that architecture not only permits, but demands a latitude in the application of its parts, which is governed by the general intention.

RUSTICS.—*See* the DIRECTOR, and pls. 43 and 50.

RUSTIC COINS.—*See* pl. 38.

RUSTIC DOOR.—*See* pl. 41.

S.

SAIL-OVER.—If one or several courses project beyond the face of brickwalling, they are said to sail-over.

SCANTLING.—The dimensions of the breadth and depth of timber. Otherwise this term is applied to small timbers themselves, as common rafters, or joists.

SCOTIA.—A concave moulding, employed in the bases of columns. *See* pls. 2 and 10.

SET FAIR.—Applied after pricking-up and floated, or roughing-in and floated.

SET WORK.—LAYED AND SET.—Two coat work upon lath.

SETTING COAT.—A third coat upon floating, or a second coat upon rendering or laying.

SEWER.—Drains should be made before the foundation of a building is commenced; in constructing which, cess-pools should be made at different distances to receive the sediment. For a drain of two-brick length, in width, the sides may be one brick thick, twelve inches high, with a half-brick arch. For one of three-brick length, the sides may be one brick thick, fifteen inches high, with a half-brick arch. And a drain of two feet six or three feet wide, may have its sides nine inches thick, fifteen or eighteen inches high, and a nine-inch arch. The bottoms of drains are usually paved with bricks laid flat.

SHOOT.—PUSH.—THRUST.—*See* DRIFT.

SKEW BACK.—A bevel abutment for scheme or straight arches.

SKIRTS.—This term, when applied to a roof, signifies the overhanging of the eaves.

SLATING.—The following are the names of the principal kinds of slates in ordinary use, arranged according to their quality. Westmoreland, rags, imperial, duchess, countess, ladies, and doubles.

It would require one-third more of the coarsest than of the finest slate to cover the same roof; hence the ultimate difference in the expense is not considerable. But as the fine slate derives its lightness less from the quality of the stone than the thinness to which it is reduced, it is less durable than the heavier kind. The ordinary colours of slate are white, brown, and blue. The dark blue kind is the most, and the light blue the least porous. When a slate produces a complete sound on being struck, it is a sign of its good quality; but it should cut clear, and not shatter by the use of the zax. The most certain method is to weigh one or more pieces of slate, and immerse them in water for twelve hours. After wiping them, ascertain their increase of weight; which, in good slate, should not exceed one drachm in a dozen pounds.

For what is termed patent slating, slates of a large size are screwed upon the rafters, without boarding; and narrow slips of slate laid in putty, applied to their joints.

SLEEPERS.—The timbers used for bearing ground joists, and which. for boarded floors, may be placed at nine or ten feet distance. The space between the stones or small brick pillars, which serves to shorten the bearing of sleepers, may vary from five to nine feet, according to their strength.

SOFFIT.—The under side of the heads of apertures, architraves, or the corona of cornices.

SOMMERING.—The radiating or continued joints of an arch tending to its centre.

SPARS—COMMON RAFTERS.—*See* Rafters.

SPHERIC GROIN.—The intersection of two spherical vaults.

SPHERIC VAULT.—A vault, forming the whole, or any portion of a hemisphere.

SPHERO-CYLINDRIC GROIN.—Formed by the intersection of a spherical vault of a greater, with a cylindrical vault of a less height.

STAFF.—A slip of wood at the projecting angle of a wall, intended to preserve it from injury.

STAIRS.—Stairs are of different kinds. Those in ordinary use are, dog-legged, bracket, and geometrical stairs.

To ascertain the requisite number of steps in a staircase, divide the height of the story, reduced into inches, by that of one of the intended steps.

The dimensions of staircases, like their design, are governed by the quality of the building for which they are intended. The length of the steps vary from two feet and a half to ten feet; the height of the risers from five to eight inches; and the breadth of the treads, from ten to, sixteen inches.

STANCHEON.—*See* Puncheon.

STILE.—The stile of a door is the perpendicular portion of the framing at each of the two sides.

STRETCHERS.—Bricks laid lengthways in the length of the wall. A course of these, uninterrupted by headers, is named a stretching course. The term stretchers bears the same signification in masonry, being those stones whose length is placed in the direction of that of the wall.

STONE.—The structure of stone is either laminated, granulated, or of a mixed kind.

Laminated stones stones consist of thin plates or layers, cohering more or less, strongly together. When the layers are of considerable size, and cohere so slightly that they may be easily separated, the stones are said to be slaty. The layers are always nearly parallel to the quarry-beds of the stones; and they should invariably be horizontal, or as nearly so as possible, in a building; otherwise the action of the weather will cause them to separate and fall off in flakes: besides their being apt to split in any other position, when under a great strain. If, for example, a block of flag-stone were converted into a pillar, so as to leave each lamina, or flag of which it is composed, posited horizontally, it would sustain any weight not capable of crushing it to atoms; but if the lamina were placed in an inclined position, so as to form an acute angle with the axis, an inconsiderable pressure would occasion them, where the cohesion was slightest, to slide over each other. Again, if the lamina were placed parallel to the axis, the pillar, under sufficient pressure, would divide vertically into several parts; and though rather stronger than in the last instance, would still be comparatively weak. Hence, attention to the position of stones, and to veins, or other indications of the existence of lamina, deserves particular notice.

In sand stones, the direction of the layers may often be discovered by their different shades of colour; in others, by the positions of minute scales of mica, which always lie parallel to the layers. In most stones the direction of the layers may be ascertained by the facility with which the stone yields to the tool in that direction; but a considerable degree of practice is necessary to acquire so nice a discrimination of resistance. Among laminated stones, those are the most durable in which the laminæ are least distinct, and the texture uniform. When the laminæ do not perfectly cohere, they are soon injured by frost, and they are wholly unfit for situations alternately wet and dry.

Granular stones consist of distinct concretions resembling grains, either of the same, or of different simple minerals cohering together. When the structure is uniform, and the grains or concretions small, stones of this kind are always strong and durable, if the concretions themselves are so. Granular stones are sometimes open and porous, but when they are uniformly so, they seldom suffer materially by frost; because their uniform porosity allows the expansive force of the congealing water to be distributed in every direction.

Stones of a compound structure, partly laminated and partly granular, have more or less of the characters of the two classes just described; for it may be observed in coarse-grained granite, that the laminated structure of some of its parts renders it very susceptible of disintegration. All kinds of stones obtained from quarries, are found divided by vertical or inclined seams, which are sometimes so close, that they cannot be distinguished till the stones are wrought; but they often separate under the tool at these seams. Hence it is not safe to employ stone to resist any considerable transverse strain, on account of the difficulty of knowing where those seams are.

Portland stone, from Dorsetshire, is much used in the neighbourhood of London. It is of a dull colour approaching to white; and when recently brought from the quarry, is easily wrought; but afterwards increases in hardness.

Purbeck stone, also from Dorsetshire, is generally employed for steps, paving, &c.

Freestone is a general name for stones, whose relative value for the purposes of building greatly differ. It consists of clay and silex; the proportion of the latter being sometimes one half, though generally it is much less. The hardness of the stone depends on the relative quantity of each substance. This plentiful stone often passes under the name of grit or sand stone; the various kinds of which are softer when new from the quarry, than after having been exposed for some time to the action of the air. The general colour of freestone is a dull red; but it is sometimes found of a colour resembling Portland stone, as at Knipersly, in Staffordshire; and at Hollington, near Uttoxeter. Freestone, from the same quarry, commonly presents a diversity of colour; and if used without care, would give a motley appearance to the buildings in which it might be employed. To prevent this, the stones should be faced, dried, and sorted before they are used; because when recently brought from the quarry, and damp, these shades do not present themselves.

STRENGTH.—The following experiments shew the weights required to crush cubes, of brick and stone, of one and a half inch.

——	Specific Gravity.	Pounds Avoirdupois.
Brick of a pale red colour	2·085	1265
Roe-stone, Gloucestershire	. . .	1449
Red brick	2·168	1817
Yellow face-baked Hammersmith paviors	. . .	2254
Burnt ditto	. . .	3243
Stourbridge, or fire brick	. . .	3864
Derby grit, a red friable sand-stone	2·316	7070
Ditto from another quarry	2·428	9776
Killaly white freestone, not stratified	2·423	10264
Portland	2·428	10284
Craig Leith, white freestone	2·452	12346
Yorkshire paving with the strata	2·507	12856
Ditto ditto against the strata	2 507	12856
White statuary marble, not veined	2·760	13632
Bramley Fall sand-stone, near Leeds, with strata	2·505	13632
Ditto, against the strata	2·506	13632
Cornish granite	2 662	14302
Dundee sand-stone, or brescia	2 530	14918
Craig Leith, with the strata	2·452	15560
Devonshire red marble, variegated	. . .	16712

——	Specific Gravity.	Pounds Avoirdupois.
Compact limestone	2·584	17354
Peterhead granite, hard, close-grained	. . .	18636
Black compact limestone, Limerick	2·598	19924
Purbeck	2·599	20610
Black Brabant marble	2·697	20742
Very hard freestone	2·528	21254
White Italian veined marble	2·726	21783
Aberdeen granite, blue kind	2·625	24556

STRUTS.—Pieces of timber which abut against the lower extremities of truss-posts; and which serve to strengthen the principal rafters.

SUMMER.—A piece of timber, which when placed for the support of a portion of an exterior wall, is termed a bressummer; but when in the middle of a floor, it is named a beam or girder.

STUCCO.—FINISHING.—The last of three-coat plaster, well floated and troweled.

STUCCO.—The following is the method of preparing Liardet's or Adam's oil-cement or stucco.

For the first coat, take twenty-one pounds of fine whiting, or oyster-shells, or any other sea-shells calcined, or plaster of Paris, or any calcareous material calcined and pounded, or any absorbent material whatever, proper for the purpose; add white or red lead at pleasure, deducting from the other absorbent materials in proportion to the white or red lead added; to which put four quarts, imperial measure, of oil; and mix them together with a grinding mill, or any levigating machine. Afterwards mix and beat up the same with three pecks and a half of any sand or gravel, or of both, mixed and sifted; or of marble or stone pounded; or of brick-dust, or of any kind of metallic or mineral powders; or of any solid material whatever, fit for the purpose.

For the second coat, take sixteen pounds and a half of superfine whiting, or oyster-shells, or any sea-shells calcined, &c., as for the first coat; add sixteen pounds and a half of white or red lead, to which put six quarts and a half of oil, and mix them together as before. In like manner mix and beat up the same with three pecks and three-quarters of fine sand or gravel sifted; or stone or marble pounded; or pyrites or any kind of metallic or mineral powder, &c. This composition requires a greater proportion of sand, gravel, or other solids; according to the nature of the work, or the uses to which it is applied. If it be required to have the composition coloured, add to the above ingredients such a proportion of painter's colours, as will be found necessary to produce the colour required. In making the composition, the best linseed, or hempseed, or other oils proper for the purpose, are to be used, boiled or raw, with drying ingredients, as the nature of the work, the season, or the climate requires; and, in some cases, bees-wax may be substituted in place of oil. All the absorbent and solid materials must

be kiln-dried. If the composition is to be of any other colour than white, the lead may be omitted, by taking the full proportion of the other absorbents; and also white or red lead may be substituted alone, instead of any other absorbent material. The first coat of this composition is to be applied with a trowel, and floated to an even surface with a handle-float. The second coat should be applied when the first is nearly dry; and worked down and smoothed with floats, edged with any hard smooth substance, not liable to stain. In order to make the composition adhere more strongly to the surface to which it is intended to be applied, it may be necessary to moisten the part, previous to laying on the first coat, with the same kind of oil and ingredients before mentioned, passed through the levigating machine, and reduced to a more liquid state. This composition admits of being either modelled, cast in moulds, or of receiving plain or decorative painting.

STUD WORK.—The quartering in a trussed partition.

SYSTYLE.—An intercolumniation of two diameters.

T.

TAIL.—When applied to a slate, it signifies the opposite end to that which is pierced for nails.

TEMPLE.—Amongst antique remains, those which hold the first rank, are temples. The rites of paganism caused the people to assemble at the temples of the principal divinities on certain solemn days of the year: and the worship chiefly consisted of sacrifices which were offered at the foot of the peristyle, in the centre of the enclosures by which they were surrounded. The temples dedicated to the same deities, but under particular invocations, as also those of the divinities of a second order, although unceasingly, yet were only successively frequented, by those who attended to present libations, or merely oblations. Thus, it is easy to discover the extent and disposition of their temples; and that the interiors were not required to be of any considerable dimensions; as the cella was principally destined to contain the statue of the tutelary deity; as also the vases and tripods belonging to, and necessary for, the sacrifices. The reflected study of the structure of the antique temples alone, demonstrates the truth of this opinion; independently of the support it receives from history. Hence, the purposes for which those edifices were erected, the remains of which are erroneously denominated by the names of the Temple of Peace, the Pantheon, &c.; being the only constructions bearing this name, that present spacious interiors, and originated, at an early period, in the unfounded conjectures of those writers that examined them. The temple of Jupiter Capitolinus may be classed amongst the most important of the earliest temples erected at Rome. It was commenced by Tarquin the elder, and completed by Tarquin the Superb. Its interior disposition presented a principal naos, having an aisle on each of its two sides; the naos was consecrated to Jupiter, and the aisles to Juno and Minerva. At its exterior, the principal façade, which served as entrance, was composed of three ranges of columns, with an entablature

nd pediment, and the sides presented two ranges. It was under these peristyles that the triumphant warriors, after having offered sacrifice to the great deities, gave a sumptuous feast to the senate. Ths entire of this temple was, including the porticoes, 193 English feet in length, and 179 in breadth.

The Temple of Piety; now St. Nicholas in Carcere, Montanara-place, is supposed to be the site of the prisons constructed by the orders of Claudius the decemvir, in which, an old man condemned to die by starvation, was preserved by being nourished from the breast of his affectionate daughter, who for this purpose visited him daily; and this circumstance caused the consuls Quintius and Attilius to erect a temple dedicated to Piety in memory of it.

Serlio conjectures it to have formed a quadrangular nave, having a façade presenting six Doric columns, with an entablature and pediment; the columns being likewise continued round each of its sides.

The Temple of Saturn, situated near the capitol, formerly served as the public treasury, All that remains, which is antique, is a portion of brick walling; presenting, in some parts, detached pieces of cement, with which it appears to have been covered.

For a description of the existing remains of the antique temples, *see* the ARCHITECTURAL DIRECTOR; articles, DORIC, IONIC, and CORINTHIAN ORDERS.

TEMPLETS.—Short pieces of timber placed under girders, in order to prevent settlements, by distributing the weight over a more extended surface.

TETRASTYLE.—A disposition of four columns at the entrance of antique temples.

THROUGH STONES.—*See* ASHLAR, and BOND.

TIE.—This term, in carpentry, is applied to such pieces of timber in a frame, as tend to bind two other pieces together.

TIE BEAMS.—The following is a table of the scantling of tie beams, according to their length.

Bearing.	Fir Scantling.	Oak Scantling.
ft.	in. in	in. in.
30	10 × 6	9 × $5\frac{1}{4}$
40	12 × 7	$10\frac{3}{4}$ × 6
50	14 × 8	$12\frac{1}{2}$ × 7
60	16 × 9	$14\frac{1}{4}$ × 8

TIMBER.—The wood of different trees varies in strength, hardness durability, and beauty; and, consequently, in its fitness for the many purposes to which it is applied. The wood which is felled and seasoned for the purpose of building, is called timber.

If the stem or trunk of a tree be cut across, the wood is found to be made up of numerous concentric layers or rings; very distinct in some trees, but less so in others. One of these layers is formed every year;

consequently their number corresponds nearly with the age of the tree. Each layer consists, in general, of two parts; the one solid, hard, heavy, and dark coloured; the other of a lighter colour, porous, and soft; which renders the lines of separation between the annual layers distinct. Scarcely any two layers of the same tree are precisely alike, either in the proportion of the hard part, or in the thickness of the layers; as the layers vary in thickness according to the degree of vegetation which took place in the years of their formation. They also vary in thickness in the same tree; owing either to the situation of the principal roots, or to the aspect; the annual layers being always thicker on that side of the tree which has been most favourable to the growth of the roots, or that has had the advantage of a good aspect.

Wood appears to be composed of various vessels, which in the living tree convey the fluids necessary to its growth; and between those vessels cells intervene. There is nothing of the character of solid fibres in wood, except the thin membraneous coats of the cells and vessels; which adhere so slightly together in recently formed wood, that it is easy to separate them. The vessels, in the growing tree, are intended to convey a watery fluid, called the sap, from the root to the leaves; when it arrives at the leaves it undergoes some changes, and returns through the bark; and the bark being expanded by this accession of moisture, rises from the wood, and leaves a cavity that becomes filled with the returning sap; which gradually hardens, and forms a new layer of wood. The rising sap flows chiefly through the annual ring nearest to the bark; and from the experiments of Mr. Knight, it appears that the sap, during its ascent, dissolves some portion of a substance that had been deposited in the vessels of the wood during the preceding winter, for the nourishment of the buds, leaves, and young wood; hence the flowing sap is more dense in the upper than in the lower part of a tree. Dr. Darwin draws a like conclusion from the debarked oaks producing leaves.

In trees, as the leaves expand, the sap ceases to flow, and the bark again adheres to the wood; and from the middle of June to the middle of August, there appears to be a pause in vegetation; but after this period the sap again begins to flow, and the bark which adhered so closely in the preceding months, may be separated as easily as in spring.

The sap, which rises through the wood, from the roots, is very different in its nature from that which descends through the bark to form the new layer of wood. That which ascends, is nearly as liquid as water, and is called the common sap. It has, in general, a sweetish taste; and contains sugar and mucilage. It always contains an acid, sometimes in a free state; and, at others, combined with lime, or potash. When this sap is left to itself, it soon becomes sour; and when the proportion of sugar is considerable, it will undergo the vinous fermentation.

The descending sap, called the proper sap, differs so considerably in different trees, and is so difficult to procure in a separate state, that its properties can not be easily examined. It is invariably less liquid, and contains a much greater proportion of vegetable matter than the common

sap. It is also probable that trees of the same kind produce proper sap of different qualities in different climates; as we find the facts established, respecting timber grown in one climate, are not applicable to the same species of timber grown in another.

That part of wood next the bark is called sap-wood, because it is through it chiefly that the sap ascends: and, as it is shown by Mr. Knight, to contain the vegetable matter to be expended in forming leaves and buds, it is reasonable to suppose that the sap-wood must be more prone to decay than the internal part of the tree called the heart-wood.

As trees increase in size, the oldest part of the sap-wood gradually loses all vegetable life, and the more fluid parts of it are either absorbed by the new forming sap-wood, or evaporated; its vessels and cells become closed by the pressure of the new forming wood; and it ceases to perform any other part in the growth of a tree than to support it. When these changes have taken place, it is found to be more compact, and generally of a darker colour; and also contains only a small proportion of vegetable matter, besides that kind which is named, by chemists, the woody fibre. It is then heart-wood, or wood in its most perfect state.

The sap-wood is softer, and generally lighter coloured than the heart-wood, and contains a considerable portion of vegetable matter, that partakes of the nature of the sap which ascends through it. It is found to decay rapidly, and is also very subject to worms. The reason is obvious, for it contains the food which they live upon, and is absorbed or evaporated from the heart-wood.

The proportion of sap-wood, in different trees, varies greatly. Spanish chesnut has a very small proportion of sap-wood; oak has more; and fir, a still larger proportion than oak; but the proportions vary according to the situation and soil. Three specimens of a medium quality gave the following:—

Chesnut, entire age	58 yrs.	15½ in. diam.	7 yrs. sap-wood	⅜ in. thick.
Oak	6	517	17	1¼
Scotch Fir		34		2½

Therefore, if the diameter be unity, or 1, that part of it which is sap-wood, will be in the chesnut, 0·1; in the oak, 0·294; and in the Scotch fir, 0·416. The Scotch fir was the produce of Mar Forest.

The life of trees, like that of men, has been commonly divided into three stages; infancy, maturity, and old age. In the first, the tree increases daily; in the second, it maintains itself without sensible gain or loss; but in the third it declines. These stages vary in every species according to the soil, aspect, climate, or the nature of the individual plant.

Sir H. Davy states, that oak and chesnut trees decay sooner in a moist soil than in one that is dry and sandy; and that their timber is less firm. The sap-vessels being expanded by moisture, without the necessary degree of nourishing matter, the general texture becomes

necessarily less firm. Such wood splits easily, and is very liable to shrink and swell with the changes of the weather.

Trees of the same kind arrive at the greatest age in that climate which is best adapted to their nature. The common oak, the fir, and the birch thrive best towards the north; whilst the ash, and the olive tree thrive best towards the southern parts of Europe.

We find, says Mirbel, the ashes of Calabria and Sicily to be longer lived than those of Prussia or Great Britain. Oak and chesnut trees, under favourable circumstances, sometimes attain an age of 1000 years; but beech, ash, and sycamore seldom attain half that age. The decline of trees appears to be caused by the decay of the heart-wood; and it is this, as Sir H. Davy remarks, that seems to constitute the great limit to the age and size of trees.

In trees that have not arrived at maturity, the hardness and solidity of the wood are the greatest at the heart, and decrease towards the sap wood; but in the mature or perfect tree, the heart-wood is nearly uniform, while that of a tree on the decline, is softer at the centre than it is next to the sap-wood. These observations were made by Buffon in the course of his numerous experiments, and also by Duhamel.

Felling timber. "It should be," says the venerable Evelyn, "in the vigour and perfection of trees that a felling should be made." When a tree is felled too early, the greater part of it is sap-wood; and in a young tree, even the heart-wood has not acquired its proper degree of hardness; indeed the whole tree must partake so much of the nature of sap-wood, that it cannot be expected to be durable: and when a tree is not felled till it be on the decline, the wood is brittle and devoid of elasticity, tainted, discoloured, and soon decays. But in trees that have arrived at a mature age, the proportion of sap-wood is small, and the heart-wood is nearly uniform; and is hard, compact, and durable. Hence it is important that Evelyn's advice should be carefully attended to. It is true, that the proper age for each species has not been satisfactorily determined; but it is a point where great accuracy is not necessary, for half a dozen years in the age of a tree will not make much difference, provided it be not cut too early. It is cutting trees before they arrive at maturity, that is most to be deprecated; and as it is most likely to happen from interested motives, it is the more necessary to caution the practical man in this respect. Trees increase slowly in size after they arrive at a certain age, therefore it is the interest of the timber-grower to fell them before they come to maturity; because it is his object to obtain the greatest possible quantity of timber, without regard to the quality. But when the builder is sensible of the inferior quality of young timber in respect to duration, it is his province to check this growing evil, by giving a better price for timber that has acquired its proper degree of density and hardness.

The period, generally allowed for an oak tree to arrive at maturity, is 100 years; and the average quantity of timber produced by a tree of that age, is about one load and a half, or seventy-five cubic feet. In some instances oak trees arrive at maturity in less time than a hundred years, and in others, not till after that period.

The age of an oak tree, according to Daviler, should never exceed

200 years, nor should it be felled at a less age than sixty. Belidor states about 100 to be the best age for the oak. It is much to be regretted, that in districts where the oak flourishes, it is seldom suffered to attain a mature age; being often cut before the trees will produce fifty feet of timber each. The ash, larch, and elm, should be cut when the trees are between 50 and 100 years old; and between 30 and 50 is a proper age for poplars. The Norway spruce and Scotch pine are generally cut when between 70 and 100 years old.

In order that timber may be durable, it is also necessary to attend to the proper season of the year for felling. But, on this point, there is much difference of opinion; and it is only to be decided by attending to the state of trees at different seasons of the year. The most proper period for felling timber is undoubtedly that in which it is most free from extraneous vegetable matter; or such matter as is intended to be expended in leaves and buds, and which is of a more saccharine and fermentable nature than the proper juices, or such as form the wood. A tree deposits in the sap-wood, and also in that part of the heart-wood which adjoins it, a portion of matter to be dissolved by the rising sap; and at the period when the leaves are putting forth, the wood must be filled with matter in a state ready for germination; consequently timber cut at that period, must be easily acted upon by heat and moisture, and subject to rapid decay; or to be destroyed by worms. Now there are two periods in the year, the spring and autumn, when trees are in a state of vegetation; therefore at these times it is desirable to avoid felling timber for any other than temporary purposes. Of these periods the spring must be the worst, because then trees contain the greatest quantity of matter in a state fit for germination.

On the other hand, the best time for felling timber is in mid-winter, or mid-summer; as at these times the vegetative powers are at rest, or have expended all the most changeable parts in producing leaves, &c. In some kinds of trees, a little after midsummer, appears to be decidedly the best time for felling. Alder, felled at that time, is found to be much more durable; and Ellis says, that beech, when it is cut in the middle of summer, is better and less liable to be worm-eaten; particularly if a gash be cut to let out the sap some time before felling. And as summer felling is an advantage in some species, it seems reasonable to conclude that it will be so in all.

But, in oak trees, the bark is too valuable to be lost; and as the best period for the timber is the worst for the bark, an ingenious method has been long partially practised, which not only secures the bark at the best season, but also materially improves the timber. This method consists in taking the bark off the standing tree early in the spring, and not felling it till after the new foliage has been put forth, and is dead. For by the production of new buds, the fermentable matter is expended, and the sap-wood becomes nearly as hard and durable as the heart-wood; being both less liable to decay, and to injury by worms.

Buffon has ascertained, by experiment, that the wood is materially improved by this method of barking the trees in the spring, and felling them about the end of October. Duhamel, whose extensive knowledge

of the nature and qualities of woods is well known, recommends the same method; and Evelyn states, that " to make excellent boards and planks, it is the advice of some that you should bark your trees in a fit season, and so let them stand naked a full year before felling." But a tree will not be benefited by standing so long; and the best time for felling appears to be when the new foliage has been put forth, and is dead, as Mr. S. Pepys observes in his paper on the subject. Mr. Knight, to whom we are indebted for many interesting, as well as important facts respecting timber, has made some experiments and observations, from which he concludes, that in all cases where it is essential to give durability to the sap-wood of oak, the trees should be barked in the spring, and felled in the ensuing winter.

When the bark of a tree is not of sufficient value to defray the expense of stripping, the timber should be felled during the months of December, January, or February; or during the month of July. Winte felling is recommended by most writers. According to Vitruvius, the proper time for felling is between October and February; and he directs that the trees should be cut to the pith, and then suffered to remain till the sap be drained out. The effusion of the sap prevents the decay of the timber, and when it is all drained out, and the wood becomes dry, the trees are to be cut down; when the wood will be excellent for use. A similar effect might be produced by placing the timber on its end as soon as it is felled; and it would, no doubt, compensate for the extra expense by its durability, when used.

In France, so long since as 1669, a royal ordinance limited the felling of naval timber from the 1st of October to the 15th of April. Bonaparte directed that the time for felling naval timber should be effected between the 1st of November and the 15th of March, in order to render it more durable.

Seasoning timber. When timber is felled, the sooner it is removed from the forest the better; it should be removed to a dry situation, and placed so that the air may circulate freely round each piece; but it should not be exposed to the sun and wind. Squared timber does not rift or split so much as that which is round; and when the size of the trees will allow of it, it is better to quarter them. When beams are to be used the full size of the tree, it would be a good preservative against splitting, to bore them through from end to end. Irregular drying causes timber to split; and this method would assist in drying the internal part of the beam, without decreasing its strength.

Duhamel has shown that it is a great advantage to set the timber upright, with the lower end raised a little from the ground; but as this cannot always be done, the timber-yard should be well drained, and kept as dry as possible. Paved yards are to be preferred, and the paving should have a considerable fall, to prevent water standing. If the paving were laid with ashes it would be better; those from a forge or foundry would be excellent: even an unpaved yard would be improved by a coat of ashes, to prevent any thing growing among the timber.

If timber can be kept some time in a dry situation before it be cut into scantlings, it is less subject to warp and twist in drying; but

during the time that it is kept in the tree or log, it should be carefully piled, so as to leave a space for a free circulation of air between each piece, and also between the timbers and paving, or ground. Latterly, in some of the Government-yards, the timber has been laid upon cast-iron bearers, instead of being laid upon refuse pieces of wood; as the refuse wood is often half rotten, and must in some degree contribute to infect the sound timber. Timber is often suffered to lie half buried in the ground, or grown over with weeds, till it be covered with fungus, and impregnated with the seeds of decay, before it is brought into use.

When it becomes desirable to convert timber into small scantlings, it still requires attention; as the better it is seasoned, when brought into work, the better the work will stand, as well as being more durable. The experiments of Duhamel show, that such scantlings will dry soonest in an upright position; and that the upper end dries more rapidly than the lower one. But whether the pieces of timber be piled on the end, or laid horizontallly, a free space should be left round each piece, and the situation should be dry and airy; yet not exposed to the direct rays of the sun. If the scantlings be laid horizontally, short blocks should be put between them; which will preserve them from becoming mouldy, and will contribute much towards rendering the sappy parts more durable.

Gradual drying, where the time can be allowed for it, is the most certain means of giving durability to timber, by fixing those parts of it which are most liable to be acted upon by heat and moisture.

It is well known to chemists, that slow drying will render many bodies less easy of dissolution, while rapid drying, on the contrary, renders the same bodies more soluble; besides, all wood in drying loses a portion of its carbon, and the more in proportion to the height of the temperature.

There is, in wood that has been properly seasoned, a toughness and elasticity which is not to be found in wood rapidly dried. This is an evident proof that some essential parts are dissipated by a high heat. Also a forced seasoning produces a hard crust on the surface, which will scarcely permit the moisture to evaporate from the internal part, and is very injurious to the wood.

For the general purposes of carpentry, timber should not be used in less than two years after it is felled; and this is the shortest time that ought to be allowed for seasoning. For joiners' work it requires four years, unless other methods be used; but for carpentry natural seasoning should have the preference.

Duhamel says, that the quantity of matter which ought to be evaporated from green oak, is about one-third or two-fifths of its weight; the proportion, however, will vary according to the age and quality of the timber, and the nature of the soil that produced it.

Water seasoning. On account of the time it requires to season timber in the natural way, various methods have been tried to effect the same in a shorter time. Perhaps the best of these is to immerse the timber in water as soon as it is cut down; and after it has remained about a fortnight in water, but not more, to take it out, and dry it an airy situation.

Evelyn directs to " lay your boards a fortnight in water (if running the better, as a mill-pond head), and then setting them upright in the sun and wind, so that they may pass freely between them, turn them daily ; and, thus treated, even newly-sawn boards will floor far better than those of many years' dry seasoning, as they call it :" and he adds, " I the oftener insist on this water-seasoning, not only as a remedy against the worm, but for its efficacy against warping and distortions of timber, whether used within or exposed to the air."

Duhamel, who made many experiments on this important subject, states, that timber for joiners' use is best put in water for some time, and afterwards dried ; as it renders the timber less liable to warp and crack in drying ; but he adds, " where strength is required, it ought not to be put in water." And he found from numerous experiments, that timber which had remained some time in fresh water, lost more of its weight in drying than that which was dried under cover ; and he observed, that green timber that had been steeped in water for some time, was invariably covered with a gelatinous substance.

Timber that has been cut when the tree was full of sap, and particularly when that sap is of a saccharine nature, must be materially benefited by steeping it in water; because it will undoubtedly remove the greater part of the fermentible matter. Duhamel has ascertained that the sap-wood of oak is materially improved by it, being much less subject to worm-eat; and also, that the tender woods, such as alder and the like, are less subject to the worm when water-seasoned. Beech is said to be much benefited by immersion ; and green elm, says Evelyn, if plunged four or five days in water (especially salt water) obtains an excellent seasoning. When timber is put into water, it must be sunk so as to be completely under ; as nothing is more destructive than partial immersion. Salt-water is considered best for ship-timber ; but for timber to be employed in the construction of buildings, fresh water is better.

Steaming and boiling timber. Though steaming or boiling impairs the strength and elasticity of timber, it gives another property, which for some purposes is still more desirable than strength ; for boiled or steamed timber shrinks less and stands better than that which is naturally seasoned. Therefore it may often be useful to season timber in this manner, where joiners' work is to be executed in oak of British growth ; as, without this precaution, it requires a long time to season it so as to be fit for such purposes

The timber should not remain long in boiling water or steam ; four hours will, in general, be quite sufficient ; and after boiling or steaming, the drying goes on very rapidly ; but it is well not to hasten the drying too much. Steamed wood dries sooner than that which is boiled, according to Mr. Hookey's experiments.

How far steaming or boiling affects the durability of timber has not been satisfactorily ascertained ; but it is said that the planks of a ship, near the bows, which are bent by steaming, have never been observed to be affected with the dry rot. The changes produced by boiling, as observed by Duhamel, are not very favourable to the opinion that it adds to the durability of timber. For when a piece of dry wood was

immersed in boiling water, and afterwards dried in a stove, it not only lost the water it had imbibed, but also a part of its substance; and when the experiment was repeated with the same piece of wood, it lost more of its substance the second time than it did the first. The same thing takes place in green wood; and tender woods, or those of a medium quality, are more altered by these operations than hard woods, or those of a good quality. Dr. Watson found steeping long in cold water produced similar effects; and that box, oak, and ash, lost more weight by this process than mahogany, walnut, or deal.

Smoke-drying, scorching, and charring timber. It is an old and well founded observation, that smoke-drying contributes greatly to the hardness and durability of wood. But this method can only be effectually applied on a very small scale; yet sometimes, for particular purposes, it may be useful to season in the smoke. As a substitute for the smoke of an open chimney, Ellis advises to burn fern, furze, straw, or shavings, under the timber, which would destroy any seeds of fungi or worms, and so embitter the external surface as to prevent any future ill effect from either. It would be easy to contrive the means of smoke-drying for the use of an establishment, where much seasoned wood was used.

Scorching must do timber great injury when it is done hastily, so as to cause rents and cracks in it; as these become receptacles for moisture, and consequently must be the cause of rapid decay.

It should be always remembered, that charring the surface is only useful in as far as it destroys and prevents infection; and that it should be applied only to timber already seasoned; for when it is applied to green timber, it only closes up the pores at the surface, so that the internal sap and moisture cannot evaporate.

In that kind of decay which arises from the constant evaporation of moisture, charring the surface produces no effect. Duhamel made some experiments on this point, and found that there was very little difference between the posts he had charred, and those he had not charred, at the end of six years; but as a preventative of infection by dry rot, and of the worm in timber, charring appears to be very beneficial, and will, no doubt, be assisted by impregnating the timber with the bitter particles of smoke.

TOOLING.—In masonry, the operation of tooling is finishing the face of stones, by working them in narrow stripes, at uniform distances. The face of a stone, thus finished, is said to be tooled.

TOOTHING.—Stretchers projecting half their length at the end of a brick wall, for the purpose of affording bond to an intended adjoining wall.

TORUS.—*See* pl. 2, fig. 1.

TRANSON WINDOW.—A window divided in its height by an horizontal bar or mullion.

TRIMMERS.—Joists placed round chimneys, and the opening for staircases; for the purpose of receiving the ends of the other joists.

TRIMMER.—In bricklaying, is an arch springing from a wood trimmer below the slab of a fire-place.

TRIMMING-JOIST.—The joist that receives one end of a wooden trimmer.

TRUNCATED ROOF.—A roof that terminates flat at its summit.

TRUSS.—Pieces of timber so disposed and framed, as to be able to resist any particular strain.

TRUSS POST.—A vertical piece of timber in a trussed partition, that receives the ends of the braces. The same term is likewise applied to the king or queen posts of a roof: and the roof itself in which these are employed, is named a trussed roof.

TUSCAN ORDER.—*See* the DIRECTOR, pls. 3 and 4, and the table.

TUSK.—A sloping shoulder made above a tenon, for the purpose of increasing its strength.

TUSK TENON.—A short bearing tenon, attached to the principal tenon of such binding joists as have a considerable strain at their extremities.

V.

VALLEY.—The internal angle of a roof. Rafters so situated, are termed valley rafters.

VAULT.—An arched ceiling or roof, constructed of masonry or brickwork; so arranged that the materials of which it is composed support each other.

VESTIBULE.—A part situated at the entrance, or at the foot of the principal staircase of a builing or edifice; and serving as a thoroughfare to the different apartments.

VOLUTE.—A spiral scroll, forming the principal characteristic of the Ionic capitol. The Corinthian and Composite capitals, have each eight angular volutes; those of the former capital being accompanied by eight lesser ones named helices.—*See* pls. 9, 10, 11, 12, 15, 16, 19, and 20.

VOUSSOIRS.—VOUSSORS.—The stones employed in the construction of an arch, or such as form its face.

W.

WALL.—Walls of unhewn stone are named rubble walls; of which there are the coursed and the uncoursed; the stones of the former being axed or hammer-dressed, and each course wrought to a certain height; while in the uncoursed walls the stones are employed nearly in the same state as they came from the quarry.

Tooling completes the finish of the face of some walls. In others the surface is smoothed. Walls faced with stones, averaging nine inches thick, one foot high, and two feet six inches long, and backed with brick or rubble, are termed ASHLER; which *see*, as also MASONRY.

WALL.—The brick-walling of houses of from three to five stories, may, from the footings to the floor of the first or ground story, be 27 inches in thickness, making the walls of the highest story nine inches; and in those of each intermediate story a proportionate reduction, leaving the water table on the inside of the wall. The walls of a two-story house may be eighteen inches thick to the first floor, reducing

half a brick up to the second floor, thus leaving the remainder nine inches thick. The thickness of partition walls may be half a brick.

WALL PLATES.—Horizontal pieces of timber, generally laid even with the inside of the walls, for receiving the ends of the joists and rafters; in the former instance they are termed joists-plates; and in the latter, raising, or top-plates.

WATER TABLE.—A kind of ledge on one or both the sides of a wall, forming the taking-in or off-set, by the superincumbent part being reduced in thickness.

WINDOW.—*See* the DIRECTOR, and pls. 47, 48, and 50.

	Y	N
[illegible]	[illegible]	[illegible]
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